

**NETWORK DYNAMICS IN SMALL BUSINESS FINANCING:
INSTITUTIONAL CHANGES AND TRANSFORMATIONS OF
INTER-ORGANIZATIONAL RELATIONS**

by

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ABSTRACT

A central insight in economic sociology is that firms depend on relationships with other organizations for their access to capital, information, and other resources. Such interactions among firms tend to develop into stable networks of social and economic exchange that stratify firms in an industry. My dissertation contributes to our understanding of emergent industry structures by explaining how firms build their networks during the early history of a new sector. First, I propose that firms in young industries are exposed to multiple institutional pressures from professional groups, policy makers, neighboring industries, and trade associations. Second, I argue that institutional pressures shape firms' collaborative strategies. Finally, I claim that firms are not uniformly affected by institutional pressures, since they typically differ in their exposure to different collaborative practices and beliefs. I find empirical support for these claims in a multi-method study of the U.S. venture capital industry during its formative years 1965-1988. The empirical results highlight that a young industry can develop along many different trajectories. Understanding how firms historically were affected by different institutional pressures is crucial for explaining contemporary industry structures and business practices.

CHAPTER 1: INTRODUCTION

A central insight in the field of economic sociology is that firms in many industries are deeply embedded in collaborative relationships with other organizations. Granovetter (1985) asserted long ago that such networks of social and economic exchange explain why some firms develop trust in each other and reciprocal interactions, whereas other firms engage in fierce conflict and competition. This idea about interdependencies between firms has spurred much sociological research over the past three decades. Today, we know that firms among other things use their connections to other organizations to secure scarce resources and valuable information (Burt 1992; Pfeffer and Salancik 1978), to develop new products and technologies (Ahuja 2000a; Powell, Koput, and Smith-Doerr 1996), and to attract the interest of important third parties such as financial investors (Podolny 2001; Stuart, Hoang, and Hybels 1999). Networks stratify firms in an industry (White 2002) by bringing opportunities to some organizations, while restricting the options of others (Uzzi 1996).

Sociologists working in this theoretical tradition were initially excited to find that the configuration of network structures could explain practices and processes across a wide range of empirical settings irrespectively of the content and context of the network connections (e.g. Burt 1992). Nevertheless while this idea about universal effects has generated much groundbreaking work, it has more recently come under scrutiny by researchers interested in thicker understandings of inter-organizational networks. A new

wave of research about network contingencies teaches us that patterns of inter-organizational relations and their effects often are contextual: they depend on the broader set of social structures that exist in an industry. Recent empirical studies have documented that network structures and the benefits that firms can derive from them varies across industries (Rosenkopf and Schilling 2007), regions (Owen-Smith and Powell 2004; Saxenian 1994; Whittington, Owen-Smith, and Powell 2009), countries (Hamilton and Biggart 1988; Xiao and Tsui 2007) and time (Gulati and Higgins 2003; Mizruchi, Stearns, and Marquis 2006; Powell, White, Koput, and Owen-Smith 2005). Granovetter captured this idea nicely already in his classic 1985 paper by noting that “networks of social relations penetrate irregularly and in differing degrees in different sectors of economic life, thus allowing for what we already know: distrust, opportunism, and disorder are by no means absent” (p. 491).

Three important ideas extend from these works by Granovetter and other scholars. First, the literature shows that is possible that the collaborative relations among firms are not as ubiquitous as many sociological studies about networks implicitly assume. If networks “penetrate irregularly”, there may well be contexts or times with weaker interdependencies between firms. Second, these studies indicate that it is plausible that not all firms value and approach collaborative ties with other organizations in the same manner. Indeed the recent work about network contingencies as well as Granovetter’s claim in the 1985 paper open up the idea that the very meaning of collaboration may be differently defined in different social settings. And third, the literature points to the idea that variation in meaning is consequential. The literature suggests that shifts in meaning can changes how collaboration affects organizational outcomes.

In the present dissertation, I build on these ideas to investigate how institutional pressures shape firms' understandings of collaboration. The term institutional mechanism refers broadly to the role of professional groups, policy-makers, trade associations, and other institutional bodies in channeling, transforming, and building beliefs in an industry for how firms should interact with each other. The approach that I am taking focuses especially on the effects of institutional pressures during the early days of an industry. Despite the widely held belief in the sociological literature that industry structures develop along path dependent trajectories (Gulati and Gargiulo 1999; White 1981), researchers have so far paid limited attention to how firms in new sectors approach other organizations and evaluate opportunities to collaborate with partners. As a result of this gap in the literature, we know surprisingly little about the initial conditions that start evolutionary paths and give rise to certain industry structures.

My work starts from the sociological insight that new industries are far from blank slates when it comes to social structures (Stark 1996). By following this insight and attending to institutional processes during the early days of an industry, I explain how firms and other interest groups in an industry seek to influence the institutional context that govern firms' interactions with each other (Chapter 2), and what implications institutional pressures have on the collaborative relations that organizations forge with each other (Chapter 3 and 4). In doing so, I offer a theoretical account that stresses that collaboration networks can develop in many different directions. Firms that today are embedded in cohesive networks could well have avoided close relations with other organizations if the institutional dynamics during the early history of the industry had turned out differently. Analyses of young industries can therefore enrich our

understanding of how and why firms collaborate with each other and develop the level of trust and reciprocity that Granovetter and many other sociologists take as crucial for realizing more complex forms of exchanges.

To unpack this argument, I present in this dissertation three empirical papers situated in the context of small business financing. My focus is on the venture capital industry which today is an important funding source for start-up companies, especially those with strong growth potential (Gompers and Lerner 1999). Yet the sustainability of this industry and its structures were for a long time questioned by policy-makers and practitioners alike (see e.g. Noone and Rubel 1970). In the 1960s, booming stock markets and new regulations spurred increased interest in small business investments, and the venture capital industry – as we know it today – started to take shape. Venture capital firms developed a new model for financing small businesses characterized by a focus on high technology targets, equity stakes, and relatively high levels of engagement and control in the firms that they invested. They further did so by working closely with other competing venture capital firms. My dissertation examines how venture capital firms developed these models for how to interact with entrepreneurs and other financiers during a formative period of their industry between 1965 and 1988. Understanding the formation of these networks of inter-firm relations is important, since these networks are central to the venture capital industry's ability to contribute to innovation and economic growth.

In the reminder of this chapter, I outline the overarching argument of my dissertation. I begin with a review of theories on network evolution to show how my work extends current sociological knowledge. Next I turn to institutional approaches in organization theory to develop the argument that institutional mechanisms shape firms'

practices in young industries. I conclude with an overview of my empirical context and the three papers that are at the core of my dissertation.

Collaboration among Firms in Young Industries

As already proposed, network scholars have so far paid very limited attention to the special nature of inter-firm collaboration in young industries. Indeed network theories were until recently criticized for their excessively abstract and acontextual treatment of social structures (DiMaggio 1992; Emirbayer and Goodwin 1994; Krippner 2001; Sewell 1992). The best account that we currently have about how and why firms decide to forge ties with each other in young industries comes from the literature on network evolution. This literature justifies the importance of focusing on young industries to understand collaboration among firms; yet curiously these theories offer very limited insights into the development of networks in such novel contexts.

An important message from the literature about network evolution is that firms make decisions about collaboration under a range of social constraints. While some studies conceptualize networks as means to fulfill a firm's strategic needs including uncertainty reduction and access to information and other resources (Burt 1992; Eisenhardt and Schoonhoven 1996; Ozcan and Eisenhardt 2009; Pfeffer and Salancik 1978), firms often face important limitations in their ability to form relations with desired partners (Ahuja 2000b). Social constraints stem from several different sources. One line of research has emphasized that a firm's current network positions influence the likelihood that the firm forge new collaborative relations with other firms. These studies suggest that firms learn about networking opportunities from their existing collaborators

(Gulati 1994; Gulati and Gargiulo 1999; Obstfeld 2005; Walker, Kogut, and Shan 1997). Another branch of this literature shows that firms that are located close in physical space are more likely to work with each other (Sorenson and Stuart 2001). For example, Saxenian's comparative study of Silicon Valley and Route 128 in Massachusetts demonstrates that spatial clusters of interconnected firms result from fluid labor markets, dense informal networks, and local trade associations (Saxenian 1994). Finally, research on contextual influences has long stressed the impact of norms on the formation of network ties. Macaulay (1963) has proposed that business relations are influenced by informal understandings that help firms to make sense of situations that are not regulated by formal contracts. More recent work has shown that social control supports the development of trust between firms, which in turn enables the formation of exchange relations (Larson 1992). This perspective is for instance found in research on Asian business groups which suggests that culturally sustained practices explain differences in national network trajectories (Granovetter 1994; Hamilton and Biggart 1988).

All of these studies share the idea that the pattern of collaboration that exists in an industry changes slowly. Existing inter-organizational relations, geographic proximity, and social norms sustain and reinforce network structures over time. We can thus think about networks as path dependent structures where the formation of new collaborative ties between firms depend on a history of prior decisions. White (1981) makes this point explicit in his well-known analysis of industry structures. He argues that markets need to be understood as cliques of interconnected firms. Market structures, once they are set in place, tend to be highly stable since firms have limited incentives and opportunities to move outside their current niches and form new types of relations with other

organizations. Recently, Stark and Vedres (2006) have argued that networks are best represented as structural pathways. Each firm in a market moves over time through a sequence of network positions that shape the firm's performance.

Interestingly this focus on historical trajectories leaves us with new unanswered questions. While prior sociological studies predominately have examined the slow incremental evolution of networks in mature industries, they suggest implicitly that young industries are particularly fruitful settings for understanding how networks form. Central to the idea about path dependencies is the argument that initial phases of a process are important since small decisions made during that time tend to guide subsequent decisions (e.g. Goldstone 1998; Mahoney 2000; Pierson 2000). Current theories have however paid limited attention to the factors that explain firms' collaborative decisions during such early phases, leaving us without an account for how evolutionary trajectories start. This gap in the literature is critical since the idea about path dependencies suggest that small initial differences are amplified over time due to learning effect and complementarities. Because the literature on networks offer limited insights about the processes that shape firms' collaborative decisions in these contexts, I turn next to literature in the field of organization theory where the social dynamic of young industries is an important research topic.

Institutional Mechanisms and Networks in Young Industries

Researchers in the broader field of organizational theory have long recognized that firms in young industries face a different set of opportunities and challenges than organizations that operate in mature fields. This idea is particularly evident in the works

by organizational ecologists and institutional scholars. Organizational ecologists propose that firms in young industries often struggle to make other organizations familiar with their practices (Aldrich and Fiol 1994). Before the industry becomes widely viewed as a recognized and legitimate market niche, organizations try out several business models, often without success (Hannan and Carroll 1992). Similarly institutional scholars have suggested that organizations in novel fields tend to explore multiple, and sometimes competing, ideas for how to organize their activities before institutions push organizations to move towards shared standards (DiMaggio 1991; Leblebici, Salancik, Copay, and King 1991). Both of these literatures emphasize the key point advocated in this dissertation: young industries are highly dynamic contexts where firms often explore a multitude of ideas for how to build their businesses and how to interact with other firms. To understand how firms in a young industry develop and approach collaborative ideas, we need to pay attention to the social mechanisms that make some alternatives more attractive than others.

This question is familiar to researchers within organization theory. Scholars in this research area have presented several theoretical claims to explain the emergence and diffusion of practices and strategies (Davis and Greve 1997; Tolbert and Zucker 1983), and recently arguments that explain firms' resistance to adopt new ideas (Fiss and Zajac 2004; Marquis and Lounsbury 2007). In young industries, we can expect that several institutional mechanisms shape beliefs about appropriateness and efficiency. Institutions are durable meaning systems that shape perceptions and practices in a field (Jepperson 1991; Scott 2008). My empirical analyses will emphasize especially the role of professionals, public policy, neighboring established industries, and industry associations

in shaping beliefs for how firms in a new field ought to interact with each other. Some empirical examples from the existing literature will demonstrate the theoretical implications that extend from this argument.

Consider for example Dobbin and Dowd's (1997) work on collaboration and competition among firms in the early railroad industry. Dobbin and Dowd distinguish among three historical periods characterized by drastically different industry structures. Two of these periods are of specific interest for my argument. Between 1872 and 1896, policymakers encouraged railroads to collaborate in industry cartels. During this time, railroads from different regions of the US worked together to develop an integrated transportation system. In 1897, this period of collaboration ended as the U.S. Congress passed a new antitrust act. Competitive pressures increased in the railroad industry, and prior collaborative ties were broken up. This finding illustrates my point that the meaning of collaboration in young industries often is contested and renegotiated in various institutional arenas, in this case the U.S. Congress.

Another illustration comes from Stark's (1996) work on the emergence of networks among firms in Hungary after the fall of socialism. He shows convincingly that firms without prior experience of a capitalist system developed market practices by building on the institutional arrangements that they had available during the socialist period. Stark writes: "actors in the postsocialist context are rebuilding organizations and institutions not on the ruins but with the ruins of communism as they redeploy available resources in response to their immediate practical dilemmas" (p. 994) In other words, managers transposed their prior experiences from an established institutional context to another emerging context. In Stark's work, institutional influences are informal and

spontaneous. They occur without the central orchestration of policymakers that were highlighted by Dobbin and Dowd's historical study about the railroad industry. Nevertheless similar to Dobbin and Dowd, Stark emphasizes that inter-firm networks in novel contexts depend on institutional factors that influence how firms define and evaluate the appropriateness of their interactions with other organizations.

Two theoretical implications follow from these insights. First, my focus on network formation in young industries does not reject the idea that firms' collaborative patterns depend on social constraints. I will argue that a range of institutional influences from professionals, public policy, established industries, and trade association shape collaborative patterns in a young industry. Thus firms in young industries tend to build on and extend practices that already exist in other social realms. For sociologists this argument means that research needs to focus on the range of ideas and resources that firms have available to understand the possible structures that can develop in a young industry. Speaking to the literature on path dependencies in markets, I highlight that even the initial developments in a new field are deeply influenced by the contextual factors. Often those factors originated outside the boundaries of the emerging industry. But I will show in my empirical work that new institutions, such as new regulation and associations, also form over time. These institutions offer a context for firms' social and economic relationships.

Second, from my theoretical framework follows a new level of analysis for examining how collaboration networks develop among firms. While most prior studies on network evolution have focused on processes inside organizations or between pairs of organizations, my analysis situates inter-firm collaboration in a broader social context. I

expect that institutional processes outside the firms' boundaries, and sometimes even outside the focal industry, influence why firms in some industries start to value collaboration with other organizations and engage in such practices. I expect that firms privilege ideas about collaboration to the extent that those ideas are rationalized and supported by various institutional arrangements. I will now provide an introduction to my empirical context before I offer a more detailed overview of my three empirical studies.

Empirical Context: Networks in the Young Venture Capital Industry

Empirically, my dissertation focuses on the formative years of the venture capital industry to understand how firms engage in collaboration in a new social field. Two forms of inter-organizational relations play a significant role in the contemporary venture capital industry. First, investors tend to form long-term relations with the entrepreneurs that they provide funding to. These relationships are often multiplex ties in the sense that financial resources are provided in combination with managerial and technical support (Gompers and Lerner 1999). Second, venture capital firms frequently pool resources into investment syndicates. Their shared involvement in deals has generated a web of collaborative relations among competing venture capital firms. This dual relational infrastructure has important financial and organizational ramifications. Entrepreneurs who receive funds from central venture capitalists are more likely to experience successful public stock offerings (Megginson and Weiss 1991; Stuart, Hoang, and Hybels 1999). Moreover, venture capitalists who work together in investment syndicates tend to have higher financial returns (Hochberg, Ljungqvist, and Lu 2007). This means that communities of interconnected venture capital firms help generate and sustain innovative

regions and nations (e.g. Kortum and Lerner 2000; Powell, Koput, Bowie, and Smith-Doerr 2002).

The first venture capital firms in the U.S. were established after the end of World War II (Reiner 1989), but it took several decades for the industry to mature. For example when American Research and Development (AR&D) was founded in 1946 as one of the first venture capital firms, Charles F Kettering, who was a leading inventor at that time, predicted that the firm would not survive more than five years (Ante 2008). The prediction proved to be incorrect. AR&D survived and became the first publically traded venture capital firm. But despite the financial success of individual venture capital firms, the nascent industry remained small for many years. In the early 1960s, the industry was still constituted by a set of loosely connected firms (Kogut, Urso, and Walker 2007) that frequently operated relatively independently of other investors.

Against this background, the empirical analyses in my dissertation focus on the development of networks in the venture capital industry in the period between 1965 and 1987. In this time, venture capital firms developed succinct practices for interacting with entrepreneurs on the one hand and other venture capital firms on the other hand. Venture capital firms increasingly used financial techniques to evaluate potential investment targets, and now each deal was seen as part of a broader investment portfolio. The development of these investment practices occurred during the 1970s and 1980s despite resistance from many early venture capitalists. For them more financially-oriented investment strategies symbolized a transition of venture capital from an entrepreneurial role to an investor role (Wilson 1985). Furthermore, in this time, interactions became more frequent between competing venture capital firms. Firms increasingly pooled their

resources into investment syndicates. Their shared work on deals generated ties among venture capital firms. In the mid-1980s, ninety-five percent of the firms in the industry were interconnected in one large network component (my estimate based on data from VentureXpert).

Overview of the Three Papers

In three inter-connected papers, my dissertation examines the emergence of institutional arrangements to govern inter-firm relations (Chapter 2), and how institutional mechanisms influences firms' decisions to collaborate (Chapter 3) and their selection of partners (Chapter 4). The empirical analyses draw on the case of venture capital to explain how the network structures of that field emerged during its early history. I will conclude this introduction chapter with a short summary of each empirical paper.

In Chapter 2, I examine how people in an emerging industry draw on their emerging professional expertise to justify ideas regarding the institutional arrangements that govern inter-firm relations. I examine this question in a qualitative analysis of debates in the U.S. Congress from the 1960s to the mid-1980s about the policies that directed how private venture capital firms and federally supported Small Business Investment Companies (SBICs) financed small businesses. This comparative case study is an important example for understanding changes in institutions, since changes in public policy have been described as one important factor that enabled the growth in private venture capital and the decline of the SBIC industry in this period. My analyses reveal that three interlinked questions were at the core of these policy debates: First, what

criteria should financiers use to select target companies for their investments? Second, what financial instruments should be used to structure the interaction? Third, how much influence and control should the investor have over the entrepreneur? My results show that venture capitalists' success in defining answers to these questions depended on their ability to use professional expertise as a link between their personal motives and societal concerns such as job creation and economic growth.

In Chapter 3, I examine how venture capitalists' prior career experiences influenced their decisions to form syndicates when investing in portfolio companies instead of investing alone. Firms in new and expanding industries are often forced to compete with companies in established industries for talented managers with proper skill sets (Sørensen 2004). One by product of the competition for managers is that firms in young industries often employ people with experiences from other industries that influence how they pursue business in the new industry. Drawing on this argument, I hypothesize that investment bankers and commercial bankers provided venture capital firms with two different models for how to finance small companies. Since investment bankers were used to syndicate deals, I expect that firms managed by investment bankers to have a higher propensity to collaborate on investments with other firms. Commercial bankers, in contrast, were used to a model of being a sole financier, and hence I expect firms managed by such people to be less likely to collaborate on investments. I use a dataset of venture capital firms and their managers' career experiences to test these hypotheses. I find no support for the idea that investment bankers increased the likelihood of collaboration. Yet, firms with more commercial bankers were less likely to form syndicates.

Finally, I investigate in Chapter 4 how venture capital firms' shared participation in field-wide institutions, in my case trade associations, influenced their likelihood to collaborate with each other. In this paper, I shift the focus from organizational level decisions to dyadic partner choice between pairs of venture capital firms to understand how network patterns evolve over time. I theorize that trade associations exert two forms of institutional pressures that influence the likelihood that firms form co-investment relations with each other. On the one hand, trade associations integrate firms in an industry. Trade associations are arenas where firms learn about potential collaborators, coordinate technological decisions and standards, and develop shared understandings and identities (Rosenkopf, Metiu, and George 2001; Saxenian 1994). For these reasons, firms involved in the same trade association are more likely to forge collaborative relations with each other. On the other hand, activities in trade associations depend also on firms' uniqueness. Since associations are structured around sub-communities of firms with similar characteristics and interests, they emphasize and reinforce existing distinctions in the field. Therefore, I expect that the effect of shared membership in trade association on collaboration is weaker for firms that are different in terms of geographic focus, target clients, and status. I use my dataset on venture capital firms and information about shared membership in trade associations to predict which pairs of venture capitalists were likely to work together on investments. I find that the positive effect of shared membership in trade associations on collaboration is strongly mitigated by firm differences. This finding has important implications for understanding why networks tend to be structured around cohesive clusters of similar firms.

Taken together, the three papers offer a window for understanding how institutions influence networks of inter-firm relations in a young industry. They highlight how different aspects of the institutional landscape – public policy, professional expertise, established industries, and trade associations – can shape firms’ interactions with other organizations. A thread unifying the three chapters is that institutional arrangements in young industries often are fragmented and expose firms to a set of tensions. Broadly stated, to explain the trajectory of an industry, we need to understand contingencies arising from competing institutional pressures and how individuals and firms resolve institutional tensions. I will develop this perspective on network formation in the following chapters.

CHAPTER 2: HOW INSTITUTIONAL MECHANISMS EMBEDD RELATIONS BETWEEN FIRMS: PROFESSIONAL CLAIMS IN POLITICAL ARENAS¹

Abstract

The paper examines the use of professional claims during policy-making processes as a means to influence the pattern of relations that exists among firms in a market. While prior studies in organization theory have highlighted that firms' relations with other organizations reflect institutional arrangements, less is known about the processes that shape those institutions. A qualitative analysis of hearings about small business financing in the U.S. Congress between mid-1960s and mid-1980s demonstrates that participants in policy-making processes used appeals to professional expertise to rationalize the meaning of financiers' relations with entrepreneurs and resolve tensions between private interests and societal concerns. Understanding how individuals and organizations reconcile conflicting meaning systems and embed market relations in society is crucial for explaining why networks among organizations develop into stable, self-reproducing structures.

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Introduction

Firms in industries with dispersed knowledge and resources often depend on ongoing relations with other organizations for their survival (Pfeffer and Salancik 1978; Uzzi 1996). These relationships of social and economic exchange are embedded in other institutional arrangements. While the present paper mainly is concerned with public policy, I will use the term institution to refer to regulations, norms, and cognitive frames that are shared and taken-for-granted by participants in a social field (Jepperson 1991; Scott 2008). Institutional differences are often pointed to as reasons for why networks of inter-firm relations vary between regions (Hamilton and Biggart 1988; Owen-Smith and Powell 2004) and over time (Powell, White, Koput, and Owen-Smith 2005; Stark 1996). In short, institutions influence how firms form relationships with other organizations (Grabher and Stark 1997; Owen-Smith and Powell 2004; Powell, White, Koput, and Owen-Smith 2005), and how firms extract benefits from their networks (Ingram and Lifschitz 2006; Mizruchi, Stearns, and Marquis 2006).

The institutional perspective has in recent years gained recognition in research on inter-firm networks. Also practitioners and regulators have shown interest in understanding the institutional context of firms' interactions, since economic activities span organizational boundaries in many important industries including finance, biotechnology, and semiconductors. Nevertheless, with a few notable exceptions (Dobbin and Dowd 1997; Dobbin and Dowd 2000; Fligstein 2001), the literature is largely missing an account for the processes that generate the institutional landscape that governs firms' interactions with each other. This theoretical gap is critical, since we know from a

large body of work in sociology (DiMaggio 1988; Fligstein 1990), economics (North 1990), and political science (Streeck and Thelen 2005; Thelen 2004) that the institutions that govern organizational practices do change over time leading to drastic transformations of the business environments. In this paper, I focus on the making of public policy to shed light on the processes in which business leaders, regulators, and representatives from other interest groups negotiate different understandings for how to regulate firms' interactions with their counterparts. I will also explain how people were able to resolve tensions between different interest groups, thereby influencing the outcome of institutional processes.

The development of public policy offers an illustrative example for understanding the different strategies that participants in a field can use to justify ideas about the institutional structures that govern inter-firm relationships. The creation of public policy is often associated with formalization, that is the generation of state sanctioned institutional scripts that specify how firms are expected to act under different contingencies. I extend this view on institutional creation by showing the importance of justifications grounded in professional expertise as means to rationalize and change the policies that regulate inter-firm relationships. I will propose that such justifications can counteract tendencies towards increased formalization. Since professionals' long-term reputation is grounded in disinterestedness, they can resolve conflicts between firms' private interests and broader societal concerns. For these reasons, firms can use arguments grounded in a professional expertise to generate policies that entitle them to higher levels of discretion in their interactions with other organizations.

By stressing the role of arguments based in professional expertise during policy processes, my work extends the literature on networks and institutions in two important directions. First, I contribute to theory by explaining the emergence of the institutional arrangements that govern inter-firm relations. As a complement to prior work on how political truces generate institutions that stabilize interactions among firms (Fligstein 1996; Fligstein 2001), my work highlights that the institutional landscape of a market also can be characterized by ambiguities and change. Especially, I expect this to be the case in emerging and dynamic fields where institutions often are in conflict with each other or perceived as ill-suited, since they are inherited from other social contexts. Ambiguities and uncertainties force different stakeholder groups to make sense of institutional arrangement and attribute meaning to them (Czarniawska and Sevón 1996; Edelman 1992; Goodrick and Salancik 1996). I propose that the reconciliation of institutional tensions is a necessary condition that needs to be met before firms' networks develop into stable, self-reproducing structures.

Second, my work contributes to the literature on networks and institutions by highlighting how tensions between interest groups can be resolved with arguments based in professional expertise. While prior studies have shown that assertion based on professional expertise can legitimize practices that are internal to organizations (DiMaggio 1991; Hwang and Powell 2009), I believe that such assertions play an even more significant role when we consider the practices that firms use in their interactions with other firms. A firm's relationship with another firm is often of interest for other market participants and in some cases the society at large. For example, I will show in my empirical analysis how the relations that two firms develop can translate into externalities

such as job creation, new technologies, and other positive or negative outcomes. When the effects of dyadic relations spill over to third parties, firms' relations with each other tend to become a concern for policy-makers. Arguments based on professional expertise are often highly influential in contexts where groups hold different interests. Such arguments have the capacity to embed firms' dyadic relations in society, and thereby bridging tensions between private interests and societal concerns. These tensions are inherent to many policy-making processes, since policy-makers need to listen to and satisfy multiple interest groups to stay in power (Hansen 1991).

In the following sections, I develop my account for how professional claims can be used to shape the institutions that govern interactions between firms. I do so in the context of an empirical analysis of debates in the U.S. Congress between 1965-1985 about relations between financial firms and small businesses. My empirical focus is on private venture capital firms and small business investment companies (SBICs) which are two forms of organizations that offer capital to small businesses. The two cases are valuable for institutional analyses, since changes in public policy often are seen as one key explanation for the growth of private capital firms and the decline of the SBIC industry from the mid-1960s to the mid-1980s. Furthermore regulatory changes associated the two forms of organizations with different types of small business investments. Differences can be discerned along three relational dimensions: First, which small businesses should receive capital; second, which financial instruments should be used; and third, how much power should financial firms have over entrepreneurs. For researchers interested in organizations and their networks, these empirical dimensions

translate into three questions about partner selection, the content of network ties, and social influence.

During the 1970s and early 1980s, private venture capital firms were successful in influencing several aspects of their regulatory environment. They advocated for cuts in capital gain taxes, changes of the ERISA legislation which had reduced pension funds' investments in venture capital, and better conditions for liquidating investments in small businesses. These institutional changes made it easier for private venture capital firms not only to raise funds, but also to select investment targets in capital intensive industries, making deals based on equity, and take control positions and influence the governance of the companies that they financed. I find that private venture capital firms were making arguments about institutional arrangements by emphasizing their professional expertise in the area of small business investments. They were able to amend formalized regulatory scripts to their favor by showing how their private interests aligned with the concerns of other interests groups, for example concerns about job creation and technological innovation.

SBICs, in contrast, were highly criticized during this period for being mismanaged, for showing negative financial returns, and even for committing legal violations. Firms in the SBIC industry struggled with resolving tensions between their private interests and the goals of the government that supported the SBIC industry by allowing SBICs to leverage their private capital with federal funds. Amended regulations made it increasingly attractive to focus on investments in a broad set of industries and especially in companies with owners from minority groups. The SBIC industry was also pushed towards deals with instruments that gave them limited equity stakes and control

over the companies that they financed. SBICs learned over time to work with this legislation instead of arguing for more flexible regulations that would give their more autonomy in the interactions with entrepreneurs. Thus SBICs came to operate in a different institutional environment than private venture capital firms.

How Institutional Mechanisms Embedd Relations between Firms

Long ago, Weber (1922/1978) described legal institutions as important components of capitalist societies. The rise of bureaucratic, and rule-bound, organizations was certainly one important observation behind Weber's interest in formally governed action, but his writings about economic theory also suggest that formal rules are important elements of markets, and by extension a part of the environment in which firms interact with each other. Weber described how regulation restricts the freedom of market competition by setting limitations on who can be involved in exchange and what objects that can be exchanged (Weber 1922/1978, p 82-83). In doing so, he paved the way for a large number of studies in organizational theory and economic sociology on how public policy influences firms' strategies, including firms' decisions for how to interact with other organizations in the market (Dobbin and Dowd 2000; Fligstein 2001).

The impact of public policy on network structures is for example illuminated by the varieties of capitalism tradition which distinguishes between different forms of institutional contexts, each associated with a distinct pattern cooperation and competition between firms (Hall and Soskice 2001). Firms in liberal market economies such as the United States and Britain tend to organize their interactions as arm's-length exchanges, whereas firms in coordinated market economies such as Germany and the Scandinavian

countries rely more extensively on strategic relationships. Research on transition economies such as China, Hungary and the Czech Republic further suggests that the move from socialist towards capitalist institutions changed the nature of industrial networks (Grabher and Stark 1997; Keister 2001; McDermott 2002; Stark 1996). The impact of public policy on inter-firm relations has also been documented at the level of individual industries. Historical analyses of the railroad industry (Dobbin 1994; Dobbin and Dowd 2000) and radio broadcasting (Leblebici, Salancik, Copay, and King 1991) have nicely demonstrated that the regulations define what forms of relations are accepted and desired in a market. As new definitions of how organizations should relate themselves to other market participants became instantiated in policy and legal institutions, organizations changed the modes of interactions.

As suggested in the introduction, public policy is often viewed as institutional scripts that gain authority from being supported and enforced by the state and the legal system. These scripts are abstractions that outline how firms are expected to act under different circumstances (Stinchcombe 2001). When organizational researchers talk about the development of regulatory institutions, they often refer to the process in which interpretations regarding policy and law are worked out and details become scripted into the books (Edelman, Uggen, and Erlanger 1999). I expect, however, that the development of institutions for the governance of inter-firm relations also may be based on arguments grounded in professional expertise. Unlike formalization which standardizes the rules for economic activity, professionalization is an expertise-based approach to economic governance. Professional expertise can counteract tendencies towards formalization by

generating rules that are more flexible and allow firms to act under greater levels of discretion.

There are many reasons to pay attention to arguments grounded in professional expertise during processes of institutional emergence and change. First, from the sociological literature, we know that new groups who want to become professions need to participate in policy processes to achieve that objective (Freidson 1986). Professions emerge when a group stakes out a task domain and gain institutional recognition as experts in that domain (Abbott 1988). For example, Abbott's work shows that groups that today are taken-for-granted as professions including law and medicine, had to engage in politics to achieve self-governance and recognition as experts. Since professions depend on institutional processes for their status and autonomy, I expect that arguments based on professional expertise are ubiquitous in any policy-process where groups with professional aspirations are involved.

Second, research in the fields of organization theory and economic sociology highlights that arguments grounded in a professional expertise often are convincing justifications for how economic activities should be organized. Berger and Luckmann (1967), whose work has been highly influential on modern institutional thought, recognized that experts provide the members of a society with world views that facilitate coordination and interaction. The power of these world views stems from their causal theories that explain why a social order should exhibit certain properties. While Berger and Luckmann did not explicitly discuss the sources of expertise, later work in the institutional tradition has associated expertise power with professional groups (see e.g. DiMaggio and Powell 1983).

Following these early theoretical statements, contemporary organizational research describes professional expertise as crucial for both institutional maintenance and change. For example, Greenwood et al. (2002) found that professions are important agents of change since they tend to link organizational failures to potential solutions. According to this study, and many other in the institutional tradition of organization theory, assertions based on professional expertise changes organizations by transforming the normative aspects of the organizations' institutional environments. Research building on Callon's (1998) concept of performativity has also noted the power of arguments grounded in professional expertise. Studies in this area have shown how groups that claim professional status and authority, especially economists, legitimize the use of new technologies and methods for economic transactions (MacKenzie and Millo 2003).

I expect that the power to rationalize, justify, and normalize ideas about economic activity makes arguments based on professional expertise influential during policy processes. I believe that these effects occur via two complementary paths. Most prior research has emphasized that arguments grounded in professional expertise changes organizations via normative mechanisms. Organizational theorists often describe professionals as carriers of practices and ideas in markets (DiMaggio and Powell 1983). Professionals advise, consult, and standardize of market activities and they force thereby organizations to adopt specific practices and structures (DiMaggio 1991; DiMaggio and Powell 1983; Greenwood, Suddaby, and Hinings 2002). My work will propose a second complementary causal path. I will emphasize that arguments grounded in professional expertise can change regulatory institutions which subsequently exerts coercive pressures that alters firms' activities.

My analysis builds on these insights about institutional change and professional claims to contribute to knowledge about the evolution of inter-organizational relations. I focus on the use of arguments grounded in professional expertise as a means to influence public policy. Policy processes shape beliefs about how inter-organizational relations should be structured. Such processes are often surrounded by contestations and negotiations since the value of relations with other firms is contingent on a range of factors that are difficult to foresee and thus difficult to assess a priori (Gulati and Higgins 2003; Mizruchi, Stearns, and Marquis 2006). I will further suggest that participants in policy process can use different forms of arguments for making claims about the structure of inter-organizational relations. Policy developments can be associated with formalization. Formalization generates state sanctioned rules that standardize the way that relations between organizations are structured. Policy processes can also be driven by professionalization. Professionalization represents claims that are based on expertise credentials and the process decentralizes influence and control. My argument proposes that the different principles of formalization and professionalization generate different institutional landscapes, and the use of these arguments is therefore consequential for the structure of inter-organizational relations that exist in a market. In the following empirical analysis, I disentangle the processes that shape the institutional context of firms' interactions.

Empirical Context: Private Venture Capital Firms' and SBICs' Financing

Relations with Small Businesses

Small businesses' access to external capital is a long standing concern for entrepreneurs and policy-makers alike. Commercial banks, one source of capital for small businesses, have throughout history been criticized for being too restrictive when evaluating new businesses' prospects. After the Great Depression in the 1930s, banks enforced more conservative lending policies which made it increasingly challenging for smaller firms to receive long term loans with good terms and increased their dependence on private funding sources (Reiner 1989). Against this backdrop, two related industries dedicated to small business financing were created in the 1940s and 1950s. The first private venture capital firms were founded in 1946. These firms operated as financial intermediaries between private investors and small companies. The first Small Business Investment Companies (SBICs) were established after the passing of the Small Business Investment Act in 1958. These firms were also financial intermediaries focused on entrepreneurship, but they could in contrast to private venture capital firms leverage their private capital with federal funds.

Private venture capital firms and SBICs were born into an ambiguous and uncertain institutional context. Many of the regulations that governed capital markets in that time were set in place during the 1930s and early 1940s, including the major U.S. banking acts and securities acts. These regulations were established with large financial institutions in mind especially investment banks and commercial banks, and they intended to prevent future economic depressions by separating different forms of

financial activities from each other. Moreover the existing financial regulation focused mainly on stock offerings and equity investments in larger corporations. These regulations were often perceived as inappropriate and too constraining for financial firms focused on investments in small entrepreneurial companies, since the financing of such businesses differs from that of large companies in terms of risk taking and size. Aside from the challenges stemming from inherited rules, general changes in the U.S financial markets made regulatory concerns salient for venture capital firms and SBICs in the period between 1965 and 1985. After a decade of booming stock markets, the economy began to slow down by the end of 1969. The following years was characterized by declining optimism among investors in public capital markets and rising unemployment rates. The market conditions worsened with the oil crises that started to build up in 1973 and to the list of economic challenges, high inflation rates were now added. The economy did not improve again until the beginning of the 1980s. During these years of crises, policy-makers considered a large range of measure for improving companies' and private peoples' access to capital. Among other things, credit markets were deregulated which made it easier for people to access fund but increased the cost of financing (Krippner Forthcoming).

In this period of institutional uncertainty, private venture capital firms and SBICs experimented with a range of new methods to fund entrepreneurial enterprises. Private venture capital firms and SBICs distinguished themselves from commercial banks which they saw as too focused on transactional short-term loans, and investment banks which they saw as too focused on the concerns of large corporations. In contrast, the financing models developed by these two organizational forms were centered on long-term

financial commitments both from the side of the financier and the small business. Shares in small and privately held companies are by definition not traded in stock markets and highly illiquid. Therefore, compared to commercial banks whose interactions with small businesses predominately were of an arm's-length and transactional nature, private venture capitalists and SBICs established closer relations with the companies that they funded typically for five years or more. Financing developed in this setting into a relational endeavor in which capital providers and entrepreneurs not just transacted, but also interacted and built close and long-term relations with one another. These relationships typically involved technical and managerial support along with financing (see for example Shane and Cable 2002).

Many elements in these new financing models were however difficult to align with existing regulatory arrangements and ongoing legislative processes. For example, regulators were seeking to constrain the rules of initial public offerings after the economic down turn starting in the late 1960s; yet the proposed changes were opposed by small business investors since they reduced their ability to have larger equity stakes in a company (Reiner 1989). Another example from the mid-1970s are a series of complaints in the U.S. Congress from venture capitalists, entrepreneurs, and industry associations in the U.S. Congress about the rise in capital gain taxes after 1969. This tax legislation, they argued, assumed that financiers generate returns from dividends. They continued by pointing to evidence that small businesses, in contrast to large corporations, cannot afford to pay dividends. They claimed: "Since high-growth companies can't generate enough retained earnings to finance their growth, they need constant injection of private capital. Therefore, they can't pay out a portion of their scarce equity in dividends." (Congress

1980a, p 13) This case is one of many examples where financial firms and entrepreneurs testified in front of Congress about the need for new institutional arrangements, in this case a new tax legislation, that would better support financial mechanisms targeted towards the small business community.

The particularities in financing activities developed by private venture capital firms and SBICs generated much attention from policy-makers and other interest groups during the early years of the two industries. Small businesses' need for financing was not a debated issue: The cold war, high unemployment rates, and slow economic growth made entrepreneurship and the development of new technologies prioritized political agenda items (Reiner 1989). Small businessmen testified repeatedly in Congress about the scarcity of capital and how undercapitalization restricted their growth. For example, Mr. Zschau from the American Electronics Association and an inventor of a technology for ink jet imaging described: "The capital was not available in the United States. We were repeatedly told that people were interested, but it was too risky" (Congress 1980a, p 44). Instead of discussing the need for more risk capital, congressmen and various interest groups debated the different organizational and relational means that venture capitalists and SBICs engaged in to reach that end, and how to best design institutions that would support desired outcomes (see e.g. Congress 1966b, p 1). Finding appropriate institutional arrangements was often described as difficult task. People from all involved interest groups – policy-makers, financial firms, small businesses, and others -- referred to many changes: the exceptionally high risk in the field of small business financing, the tendencies for financiers to achieve low returns, and the high rates of bankruptcy among the entrepreneurs who received funds. Moreover they were concerned with agency

problems arising from the different interests of investors, small businesses, and the government.

During the period from the mid-1960s to the mid-1980s, policy processes in the U.S. Congress generated several changes to the regulatory landscape that governed the financing activities of private venture capital firms and SBICs. As briefly outlined in the introduction of this paper, private venture capital firms developed into a set of organizations focused on capital intensive industries especially high technology sectors. Private venture capital firms invested in companies using equity instruments and they often took equity positions that allowed them to influence the governance of the company. Compare this model to the one that came to dominate the SBIC industry. SBICs focused a broader set of industries, they often used debt instruments instead of equity, and regulators restricted in their ability to take control positions in the companies that they financed.

Associated with these changes in institutional arrangements were differences in the growth of the two industries. Figure 2.1 graphs the annual number of new financing deals that private venture capitalists and SBICs closed with small businesses between 1960 and 1985. Consider first the line marked by triangles which represents financing deals closed by private venture capitalist. During the late 1970s, the number of new financing ties that were formed between private venture capitalists and small businesses increased. Private venture capitalists gained during this period recognition from policy-makers and they were able to shape formal institutions to their favor. Then turn to the line marked by circles which represents financing deals closed by SBICs. Note in particular the decline in the number of investments during the second half of the 1960s. In this

period, new regulations were enforced that restricted SBICs' investment practices. In the 1970s and the 1980s the annual number of financing events in the SBIC industry remained relatively constant. During this time, legislators and SBIC investors negotiated finer details regarding SBICs' financing activities. These changes ensure that the industry survived despite being criticized by many politicians, but they limited the industry's growth. My empirical analysis examines how these institutional changes came about by focusing on the arguments that were made by different interest groups in the U.S Congress and how those arguments spoke to tensions between firms' private interests and the objectives of other groups in society.

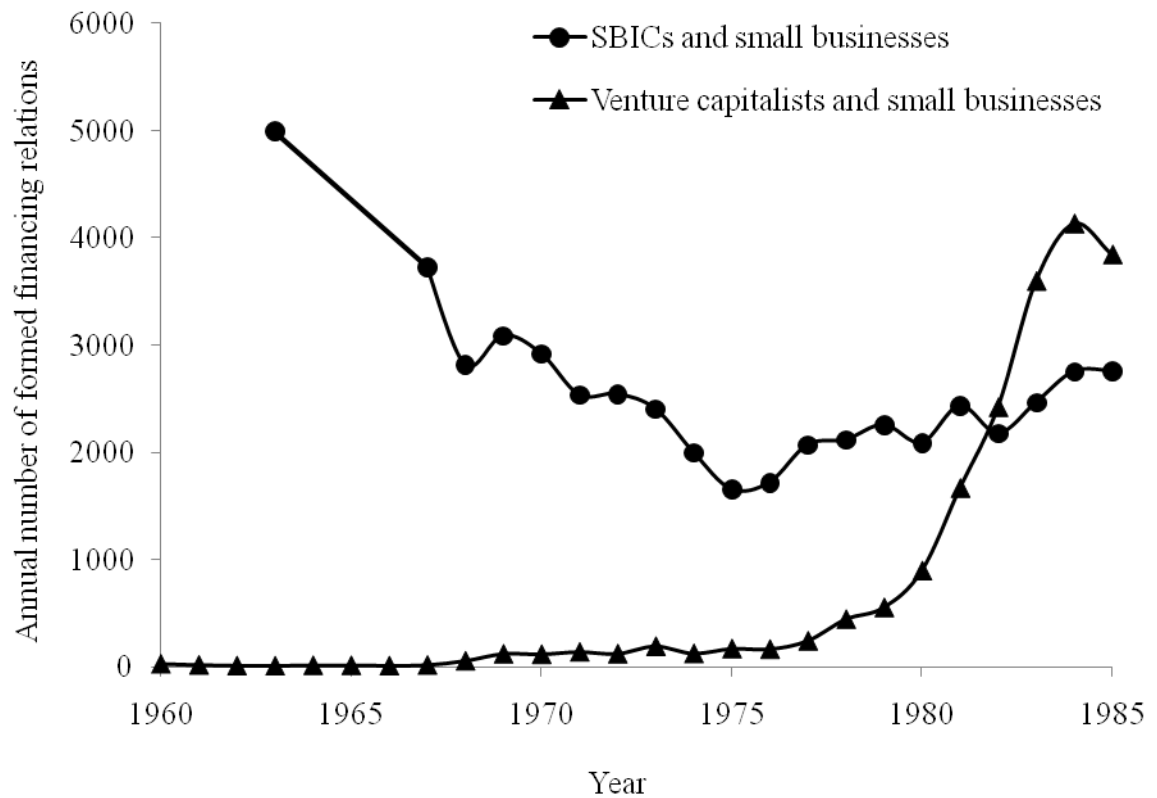


Figure 2.1 Formation of New Financing Relations for SBICs and Private Venture Capital Firms, 1960-1985. Sources: Data for venture capital relations was retrieved from the VentureXpert database. Data for SBIC relations was compiled by the author from SBA statistics presented in congressional hearings (Congress 1963; Congress 1964; Congress 1978b; Congress 1987).

Data and Method

The results reported in this paper are based on a historical study of how venture capitalists' and SBICs' financing relations with small businesses were debated during hearings in the U.S. Congress from the mid-1960s to the mid-1980s. In line with prior studies in political science and sociology, I view Congressional hearings as an important data source for understanding how policy makers and interest groups negotiate institutional arrangements (Clemens 1997; Hansen 1991). The processes that unfold in

Congress represent attempts to interpret the past, define the present, and influence the future structures of a market, and they reveal a range of tactics and strategies pursued by individuals and organizations with different interests and agendas (Owen-Smith and Craciun 2008). I started my study by identifying all transcripts from Congressional hearings in the period 1965-1985 (from the 89th to the first session of the 99th Congress) in which the main concern was capital formation and the financing of small businesses. I searched in the Lexis Nexis Congressional Universe database for term “small business” combined with different derivation of the term financing (e.g. finance, financial) or the term capital. A second coder and I read independently the chair persons’ opening statements of these hearings to identify which of these hearings that clearly focused on interactions between financiers and small businesses².

The final dataset consists of twenty-six hearings. SBICs’ financing relations with small businesses were a central concern, as defined by the chair persons’ opening statement, in twenty-two hearings spread throughout the period of interest (mid-1960s to mid-1980s). Based on the same criterion, venture capital firms’ relations with small businesses were a central concern in eleven hearings mainly held during the second half of the 1970s and the early 1980s. Appendix 1 presents an overview of the hearings analyzed in this study including the title, the organizing congressional committee, the dates, and the chair person who lead the hearing. As expected based on the division of labor in Congress, most hearings in my analysis were held in the Committees on Small

² In a robustness test, in which we coded the whole transcript for a sample of hearings, we found that the chair persons’ opening statement is a reliable source to identify the central topics of Congressional hearings.

Business in the Senate and the House respectively, and the two committees' subcommittees.

Next I relied on a qualitative content analysis to develop insights into participants' efforts to shape the institutions that govern inter-organizational relations. Each hearing contains statements by policy-makers and a set of testimonies by representatives of different interest groups. My study builds on a method that focuses on understanding variation in the claims made by different participants in policy processes, as compared to methods that center on the modal trends in individuals' belief systems and opinions. I chose this strategy since my goal is to develop theory instead of testing causal relationships. Table 2.1 provides an overview of the different interest groups that were represented in the hearings and a count of how many testimonies that were made on behalf of each interest group. In total my analysis covers 325 testimonies. 94 testimonies (28.9%) were made on behalf of small businesses, 18 testimonies (5.5%) were made on behalf of venture capital firms, and 77 testimonies (23.7%) were made on behalf of SBICs. Other interests that were frequently represented include government agencies and departments in particular the Small Business Administration, other financial institutions in particular banks, and lawyers, consultants, and independent industry experts.

Table 2.1 Number of Testimonies by Interest Group

Represented Interest	# Testimonies
Small Business	94
SBICs	77
Government Agencies and Departments	58
Other Financial Institutions	23
Lawyers, Consultants and Independent Industry Experts	20
Academia and Research Institutions	18
Venture Capitalists	18
Politicians (Excl Senators and House Representatives)	7
Large Corporations	5
Community Organizations	4
Labor	1

I analyzed the testimonies in three iterations. First, I used an open-ended coding scheme to identify the different forms of claims that were made regarding private venture capital firms' and SBICs' financing relations with small businesses. From the first iteration of data coding, the important role of formalization and professional expertise became evident. Returning to the institutional literature on institutional change, I refined my coding scheme to reflect prior theoretical insights. I continued thereafter the content analysis in a second iteration to unpack how different forms of claims were used by participants in Congressional hearings to influence the institutions that govern firms' interactions with each other. This part of my analysis centered in particular on text segments where formalization and professionalization were discussed simultaneously. Tensions between different arguments and counter arguments were here viewed as a window into understanding the political struggles that drive network change. I found in this stage that the formalization and professionalization often counteract each other during policy-making processes. Following these insights, I conducted a third and final

iteration of my content analysis which focused on how participants resolved differences in interests and opinions regarding institutional arrangements. By tracing contested aspects regarding venture capitalists' and SBIC's financing relations with small businesses across time, I was able to understand how organizations reconciled different ideas for how to develop policies and regulate the financing activities of private venture capital firms and SBICs. In the following two sections, I will outline how participants in these policy processes used arguments based on formal scripts and professional expertise to justify ideas regarding the institutions that govern the financing activities of private venture capital firms and SBICs.

Results

Formal Scripts and Professional Expertise in the Private Venture Capital Industry

Discussion about private venture capitalists' roles in small business financing took off in the U.S. Congress in the mid-1970s. Private venture capital firms struggled, similar to many other companies, to find business opportunities when the economy stagnated during the 1970s. Venture capitalists were concerned about legislative changes for initial public stock offerings (IPOs), since IPOs is one of the major sources for venture capital firms to liquidate their investments and generate financial returns. The industry was negatively affected by the Employment Retirement Security Act (ERISA) which was passed by Congress in 1974. Venture capitalists' position as financial intermediaries was undermined by a collective interpretation in the financial community that ERISA's demand for prudent fiduciary practices was incompatible with venture

capitalists' risky financing commitments to small businesses (see e.g. Congress 1980b). As pension funds and other institutional investors stopped making investments in venture capital funds, the capital that venture capital fund had available for investments in small businesses declined sharply. Venture capitalists were also concerned about capital gain taxes, which they described as factor that limited their ability to pursue investments in high growth companies (Congress 1980a).

In this period, private venture capitalists started to ask legislators for new regulation that would better suited their investment activities. Policy-makers were confronted with decisions about which types of investment activities that best would support entrepreneurial enterprises and how to design an institutional context that would be beneficial not only for private venture capital firms but also other interest groups including the small business community and the American society at large. In many hearings during the 1970s and early 1980s, venture capital firms openly criticized the regulations that governed their investments in small businesses. For example, Mr. Hagopian, General Partner of a Californian venture capital firm reflected on the developments of the venture capital market by saying: "Venture capital has historically had to break its way through government regulation in order to get to the young technology companies who are able to provide the major impetus to innovation in this country" (Congress 1982, p 47). To solve this situation he advocated for increased communication between the government and professionals as a means to build an institutional climate that can foster entrepreneurship. He continued: "alternatively, we will just be coming to you every year telling you about this regulation or that regulation, because as we knock one down another one springs up (p 52). Mr. Hagopian was by no

means alone in making the argument that the formal institutions of capital markets had hurt the venture capital industry. Similar calls for more flexible institutional arrangements better suited for equity investments in small businesses were presented by venture capitalists as well as small businessmen in several different hearings during the examined time period (e.g. Congress 1977; Congress 1980c). The debates about the institutional context for private venture capital firms can be analyzed along three dimensions: selection of investment targets, choice of financial instruments, and influence over the company that receives funding.

First, consider discussions in Congress about the targets that private venture capitalists invested in. This aspect was central to many discussions about how to regulate the venture capital industry, since private venture capital investors often pointed to their expertise in selecting out and supporting companies with strong growth potential. By supporting such companies, venture capitalists generated not only financial returns for their own firms. They contributed also to society by helping promising companies to expand their business. Such claims about expertise were frequently used by venture capitalists to justify their ability to structure their interactions with entrepreneurs in a responsible and effective way. Yet, much time was spent in Congress to discuss what level of risk that investors should take when selecting which companies to finance. The passing of ERISA in 1974 made concerns about risk salient. The prudent man rule of ERISA made venture capital firms concerned about making investments in companies with innovative but uncertain technologies, since such investments would reduce their ability to raise capital from pension funds. As a result, many high technology companies

experienced problems with raising venture capital during the 1970s despite investors' interest in their technologies.

Mr. Alan Greenspan, at the time chairman and president of an economic consulting firm, commented in Congress on the importance of regulations that allow venture capital firms to invest in companies with high risk. He argued that risk should be weighted against the potential benefits when designing institutions that governing small business investments. He testified in front of Congress: "... if you happen to make a terribly imprudent investment of investing in a company when it is very small, you are subject to grave criticism. That results from the failure to recognize that while the very nature of small business is more risky, it has far greater potential for growth and innovation in many respects than larger businesses, so that much of what is in, for example, the ERISA amendments and the like, I think are very helpful." (Congress 1980a, p 101). Venture capitalists also argued for institutions that would allow them to make investments in high technology industries despite the risk associated with new technologies. In several hearings, venture capitalists described for policy-makers the careful process in which investors evaluated new deals. This line of argumentation is evident in a testimony by Mr. Golder, President of the National Venture Capital Association. He argues that "a venture firm itself is a professionally managed corporation or limited partnership which has invested capital of \$5-50 million or more. It undertakes intensive analyses of each prospective investment, structures each investment individually to protect its position (and thereby the position of investors in the firm), and participates directly and actively in the operations of each enterprise."

It is important to note that venture capital investors claimed to be professionals despite the absence of formal education or authorization, which usually are seen as important markers of a profession. Private venture capitalists' arguments for more flexibility in choosing investment targets emphasized their knowledge about the small business community and their ability to evaluate prospects. They emphasized that they reduced risk by developing close relations with the companies that they financed and supporting them through the entrepreneurial process. Mr Golder provided more details about the various practices that venture capitalists use to ensure the success of the companies that they invest in. He continue then "Of course, the venture capitalist continues to be an integral part of the business after the investment is made. In fact, the typical professional staff of venture capital firms supervise only 3 to 7 portfolio companies per person" (Congress 1980b, p 1260). Professional ideals were in this sense used as a counter argument to reduce regulatory pressures in the venture capital industry and to allow firms to invest in targets in risky high technology industries.

Second, debates also focused on the financial instruments that private venture capitalists used to fund small businesses. While equity was the preferred instrument among private venture capitalists, venture capitalists raised concerns about the institutional arrangements that regulated such investments. As already described, they found capital gain taxes to high for allowing venture capital firms to generate any returns from equity investments. Private venture capitalists lobbied successfully for a series of cuts in capital gain taxes in the late 1970s and early 1980s. They were also partially concerned about SEC legislation that that affected private equity investors when the

companies that they invested in started the process of offering stock in public markets (see e.g. Congress 1980a).

A third dimension concerns private venture capitalists' influence over the companies that received funds. I will show in my next section that legislators were very concerned about SBICs' ability to influence small businesses and they created institutions that would secure entrepreneurs' autonomy. Private venture capitalists, in contrast, were able to link their professional expertise to their participation in governance matters. They argued that their active support made them responsible investors, which in turn would be good for the growth of the company and the economy as a whole. For example in a hearing on a bill to amend the Securities Act of 1933 and the Investment Company Act of 1940 (Congress 1978a), representatives from the venture capital industry explain for policy-makers how firms in their industry differed from other types of investment companies. Mr. Heizer, director of the National Venture Capital Association (NVCA), listed a large number of important difference including the type of interactions that venture capitalists typically developed with their portfolio companies. Venture capital firms, he argued, participate more actively in the portfolio companies than other investment companies; they take control positions and they have board seats. Formal institutions were here described as an obstacle that limited venture capital investors' discretion and flexibility to design efficient financing contracts that take into account the specific conditions of the portfolio firm.

Formal Scripts and Professional Expertise in the SBIC Industry

The SBIC industry offers an interesting comparative example to the private venture capital industry. Since SBICs had access to federal funds, policy-makers have always paid much attention to the regulation of these firms. The SBIC industry was from the outset a highly political project, and the industry's existence depended on support from policy-makers. During World War II, politicians began to express concerns over small businesses' special difficulties, including these firms' limited access to financing. After some years of temporary support to small businesses from the Smaller War Plants Corporation (SWPC), the Small Defense Plants Administration (SDPA) and the Reconstruction Finance Corporation (RFC), Representative Hill (R-CO) and Senator Thye (R-MI) started in 1953 the work of forming a new permanent federal agency, the Small Business Administration (SBA) (Congress 1953). SBA's early support to small businesses was, however, criticized by interests in the financial community as well as small businesses for being too focused on lending instead of equity. The long term commitment of equity investments was viewed as a preferred form of financing that would bring continuity for the entrepreneurial firm. Another benefit from equity is that it often can be used to raise additional funding via credit. The provision of equity financing was the official impetus behind the creation of the SBIC industry. The SBIC industry straddled the land of government support and private financing. The industry consisted of privately held firms that were licensed by the SBA. Further SBA supported the new industry by allowing SBICs to leverage their private capital from stockholders with loans from federal sources (Noone and Rubel 1970).

Yet akin to private venture capital firms, SBICs were initially struggling to make sense of the new market niche and its institutional arrangements. By the middle of the 1960s, many SBICs were in serious financial trouble as a result of unsuccessful investments and lending activities. Some SBICs were even accused for criminal violations and involved in law suits due to illegal financial transactions. Congressmen from both sides of the aisle were worried about these problems and the fact that a federally supported industry suffered from economic losses (e.g. Congress 1966a; Congress 1967). Representative Evins (D-TN) declared in the opening statement of a hearing in July of 1966 that the “[SBIC] program is falling far short of congressional hopes and objectives” (Congress 1966b). In another hearing held later the same year, the SBIC industry continued to be highly criticized. The recently appointed the SBA administrator Mr. Boutin was asked by Senator Harris (D-OK) to account for his efforts to improve the SBIC industry. Mr. Boutin testified that SBA had scaled up their investigation of the industry and classified 267 out of 708 licensed SBICs as “problem cases”. Many people testifying during this hearing asked for more SBA interventions in the SBIC industry. For example Mr. Walsh, an investigator on the staff of the Senate Permanent Subcommittee on Investigations, criticized SBA for lax oversight of SBICs and proposed that regulators needed to act more forcefully in companies that display problems to reduce losses (Congress 1966a).

In this situation of financial challenges, economic uncertainties, and even criminal violations, policy-makers and various stakeholder groups engaged in efforts to change the institutional context of the SBIC industry. Participants in these institutional processes were to some extent making claims about the need for more professional control. More

importantly, however, they emphasized the need for more elaborated regulations sanctioned by SBA. Similar to private venture capital firms, SBICs' activities were embedded in the general legal framework of capital markets. In addition, SBICs were regulated under the Small Business Investment Act of 1958. The Small Business Investment Act specified how SBIC's should operate and what tools and practices that they should use to finance small businesses. The Act further identified limitations regarding net worth, total assets, and net income for the companies that SBICs could fund (Noone and Rubel 1970). As problems in the SBIC industry were uncovered in the mid-1960s, Congressmen expressed disappointment with the industry that they had created less than a decade earlier. They started to ask for new legislations that allowed for more effective monitoring of SBICs investment activities and stricter control of how SBICs nourished small businesses. In the mid-1960s, SBA implemented a series of new rules including stricter reporting standards and more frequent reviews of SBICs. Starting in the end of 1965, SBICs were also required to file a yearly report with SBA on the performance of all portfolio companies.

From a review of the SBIC industry, the SBA administrator Boutin concluded in 1967 that smaller SBICs are particularly problematic for the industry. He suggested that "inadequate resources tend to tempt smaller companies into violations of the regulation as a means of making ends meet" (Congress 1967, p 8) As a response to these problems, Mr. Boutin proposed a bill that among other things would increase the minimum size of SBICs and drastically reduce the number of firms in the SBIC industry. The bill was supported among other by Mr. Stewart representing the National Association of Small Business Investment Companies (NASBIC). The proposal was, however, questioned by

Congressman Widnall (R-NJ) who emphasized that smaller SBICs tend to fund smaller merchants and manufacturers than larger SBICs. The problem, Mr. Widnall argued, was not the size of the SBICs, but rather their ability to make investments. “I heard there was such a rush to get money out that almost anybody who walked in for a charter could get one”, Mr. Windnall claimed (Congress 1966a, p 46). Mr. Boutin agreed that experience of investments and management skills should be important licensing criteria and added that personal interviews recently had been included in the protocol for approving SBIC licensees. As new problems were identified in the industry, policy-makers typically responded with regulatory amendments and more detailed rules.

Yet, the implementations of new regulation turned out to be challenging in the SBIC industry. The SBA Administrator Boutin stated in a hearing from 1967: “I have been distressed to find a large number of companies who just don’t give a hoot about regulation, law, or anything else. They go on their own merry way, companies operating out of somebody’s sun porch or somebody’s recreation room in the basement” (Congress 1967, pp 54-55). The rules governing the SBIC’s financing deals in the small business community became increasingly stricter during the following years, and many of the SBICs that SBA considered to be “problem cases” were put into receivership under a new law passed in 1967 or merged into other SBICs. .

Along these developments towards more standardized and detailed rules, the managers of SBICs made efforts to establish an internal norm system for the emerging industry. SBICs asked Congressmen for several legislative changes that would allow investors to structure their financing deals based on the professional expertise instead of formal regulations. A first dimension of SBICs’ financing ties with small businesses that

investors and policy-makers alike tried to influence is the selection of appropriate investment objects. Policy-makers repeatedly expressed that SBICs should fund companies that otherwise would not have access to capital. Many institutional changes reflect policy-makers' desire to direct SBICs towards investments in that would foster diverse with respect to industries, regions, and social groups. For example, in 1969 a new class of SBICs called MESBICs was established that focused on financing of small business managed by "socially and economically disadvantaged businessmen." In a hearing in 1972, representatives from the SBIC industry and Congressmen discussed how SBIC should structure their investments in minority communities and other disadvantaged groups. Congressmen and SBIC investors agreed on the value from extending SBICs' investments into these types of businesses. Congress approved a bill that gave the MESBICs special benefits including lower interest rates and possibilities of leveraging their private capital with more government funds (Congress 1972; Congress 1976).

In the mid-1970s, debates about appropriate investment objects came to focus on the size of the business that received financing. Congressman Addabbo (D-NY) questioned Mr. Kobelinski, SBA's administrator, about SBICs' recent tendency to focus on capital intensive high technology industries. He wondered if such startups should be classified by small businesses and if they should receive funding from the SBIC industry. Mr. Carson, president of a SBIC, held a different opinion. The investment philosophy of his company was distinguished from many other SBICs by its focus on few, but larger, investments in firms with growth potential. He was concerned about "the arbitrary definition of 'small business' which allows an SBIC to finance a company with 250

employees but not one with 251”. (Congress 1976, p 119) Referring to the general capital shortage, he proposed that the program should be expanded beyond the area of small businesses. Mr. Flender from MIT Development Foundation that helped to commercialize university-developed technologies raised also concerns about SBICs inability to fund high technology firms. Congressmen expressed, however, repeatedly expectations that the SBIC industry should remain focused on smaller firms. SBICs focus on smaller firms spread across regions and a range of industries differentiated SBICs from private venture capital firms.

A second aspect of SBICs’ financing arrangements that investors in the industry continuously asked Congressmen to reconsider was the formal restrictions on which financial instruments that SBICs could use. The initial wordings of the Small Business Investment Act of 1958 allowed only investments that used convertible debentures which is a form of loans that can be converted into stock. SBA also regulated the interest rates that SBICs could charge for loans. Through the National Association of Small Business Investment Companies, SBICs started to lobby for more flexible rules in the late 1960s. For instance Mr. Davis, vice president of SBICs’ national industry association NASBIC, asked Congressmen in 1967 to define the term equity capital as “liberally as possible” (Congress 1967, p 115). In 1980, Mr. Little, president of NASBIC and Mr. Levitt, Chairman of American Stock Exchange repeated the call for Amendments to the Small Business Investment Act of 1958 to give SBICs more flexibility to design their investments (Congress 1980b). And in 1982, Mr. Rider, president of a SBIC and chairman of NASBIC, argued that the industry still was not satisfied with the definitions of equity and debt used by the Treasury department (Congress 1982, p 20).

A third dimension of SBICs' financing ties with small businesses that was debated was SBICs' control over the small businesses that they financed. The original Small Business Act specified that SBICs could not control the companies that they financed. This rule was justified by policy-makers as a means to restrict SBICs' power compared to small businesses and ensure that SBICs did not develop into a set of holding companies (Congress 1967). By the end of the 1960s, the restrictions had been loosened, but SBICs could still not buy more than 49 percent of a small business' equity (Congress 1969). At the same time SBICs were expected to be active investors that helped business to reach their goals. Mr. Trisch representing an SBIC discussed this balance in a question about his firm's interactions with their portfolio companies. "We get monthly reports, again, it depends on the type of company that we are talking about. But if it is a manufacturing firm we get a steady flow of information on production, sales, as well as the usual type action reports. And we meet with them at least once a month, and very often it is weekly." He continued: "it is a strictly advisory capacity and a learning situation. We would like to know at all times what is happening with the company, so that if things go well or things go poorly we know it ahead of time, not at the last minute, and therefore we have to make some rash decisions." (Congress 1976, p 146)

Resolving Conflicts between Private and Societal Interests

The discussion so far suggests that participants in policy processes can use different strategies for justifying how institutions should be structured. I have demonstrated in my analysis of the private venture capital and the SBIC industries two diverging institutional developments for two organizational forms. In the private venture

capital industry, investors used claims about their professional expertise to counteract tendencies towards stricter regulations. Investors in the venture capital industry were critical to the limitations set up by formal institutions, and they lobbied for institutional changes that would better suit their goals. These changes included amendments to ERISA which forced venture capital firms to focus on less risky investment targets, cuts in capital gain taxes which made equity investments more profitable, and other smaller regulatory adjustments especially to SEC rules that made it easier for holder of private equity to hold control positions and later liquidate their investments. Private venture capitalists were able to change several institutional arrangements to their favor by pointing to their expertise in spurring entrepreneurship. Compare the developments in the private venture capital industry to those in the SBIC industry. The SBIC industry was increasingly regulated during the 1960s and 1970s. Policy-makers were dissatisfied with the performance of the SBICs and argued that they were too focused on their private interests. As a result policy-makers developed new regulations that prescribed how SBICs should select targets, structure their deals, and work with the companies that they funded.

These findings suggest that the outcome of institutional processes depends on the strategies that participants in policy-processes use to resolve conflicts between firms' private interests and societal goals. Polanyi (1944) suggested long ago that market arrangements tend to become stable structures when economic life interlocks with other aspects of society including politics, religion, and family life. Similarly my findings emphasize that research on inter-firms networks and institutional developments needs to focus on how dyadic relations between firms become embedded in larger social projects.

In the venture capital industry, I find that investors' attempts to shape institutions were closely associated with a more general effort to promote a view of venture capital investments as beneficial to the society as a whole. During the Cold War era, venture capital investments were depicted as an important means to develop new technologies and increase international competitiveness. As the oil crises unfolded in the 1970s, the impact of venture capital financing on the development of new technologies for energy conservation became important. The economic slow-down during that decade made also claims speaking to job creation and economic growth politically attractive. Consider for example, the conclusions of a task force on venture and equity capital in 1977 that states: "unless we keep risk capital flowing into new enterprises, our economic progress and competitiveness in world markets will erode and young people will be denied opportunity" (Congress 1977, p 17). These types of statements about venture capitalists' efforts to grow small businesses, in particular firms in high technology industries, were often used as evidence for the broader social impact of that type of financing arrangement and these justifications helped investors to mobilize support in Congress for their ideas about institutional arrangements.

In the SBIC industry, in contrast, tensions were stronger between people who believed in the value of SBICs' investments and those who did not. The structures of the market, instead of becoming stable institutions, continued for decades to be subject for political debates. Advocates for the SBIC industry argued that the SBIC program had "paid good dividends to the Government". Further advocates suggested that the capital that SBICs provided to small businesses created new jobs and larger businesses which in turn increased the Government's tax basis. For example, a member of the founding team

of an SBIC argued “I’d like to point out that in starting this SBIC, and I was one of the investment bankers, we really thought we were doing a civic service” (Congress 1977, p 171). But while the goals of the SBICs were desired, critical voices pointed to the gap between these formal goals and SBICs’ practices. For example, Senator Rees questions in a hearing from 1967 the value SBIC financing: “I have heard criticism that a great many SBIC’s are engaging primarily in speculative investments that really do nothing for the economy, primarily real estate loans [...] I think that many of us realize there are several types of businesses, but when we talk about small business you are usually talking about small business that adds to the gross national product of the country” (Congress 1967, p 73)

To summarize, tensions between private interests and societal goals were hard to resolve in the SBIC industry. Several of the hearings emphasized the need for continued revision of the institutional arrangements that governed SBICs’ relations with small businesses to protect the entrepreneurs that received funds, the private investors that invested in SBICs, as well as the federal funds that SBICs’ had access to. Policy-makers described the need for regulation as pressing, and they questioned professional norms and investors’ expertise. The stated goal from the side of Congress and the SBA was to learn from experience and constantly improve the framework under which SBICs provided financing to entrepreneurs. As problems were identified, solutions were codified into formal institutional arrangements. These in turn were enacted in SBICs’ interactions with small businesses and then reported back to the Congress as illustrative examples. Formal institutions were thus incrementally adjusted to new political demands.

Over time, members of the SBIC industry asked less frequently for more autonomy and flexibility. Instead they agreed with a majority of the policy-makers that formal institutions were needed to improve the legitimacy of the highly criticized industry. A quote from 1977 by Mr Osley, president-elect of the National Association of Small Business Investment Companies (NASBIC), illustrates such efforts to update formal institutions: "... the SBIC program has now been in existence for over 18 years and it has not been as successful as either the Congress or the industry itself would have wished. [...] On the other hand, I believe that the SBIC concept continues to be sound. [...] Surely, our joint failure to solve the entire problem should not lead us to scrap the experiment. Rather we must learn from our experience and proceed further along the partnership road to multiply the successes we have enjoyed the past 18 years" (Congress 1977, p 68-69).

Over time, investors in the SBIC industry also learned to work with the law instead of questioning institutional arrangements as investors did in the private venture capital industry. In the late 1960s, Boutin, administrator for SBA, praised SBICs run by banks for their ability to develop professional practices that aligned with formal institutions and the goals of the government. He said "[...] Bank-affiliated companies have shown substantial success utilizing the provision of law that this program has to offer [...] Our major problems are with those closely held corporations owned by families, whole owned by families or individuals where they invested their money where it looked like an opportunity to get rich quickly and they found out that wasn't so, and they started to take shortcuts, and these shortcuts have got the agency in trouble, got the companies in trouble – they just didn't work out "(Congress 1967, p 89). At the same

time, bankers' entry into the SBIC industry was not liked by many politicians who feared professional control and a new bank monopoly. In 1969, a bill was passed in Congress that restricted banks ownership in SBICs to no more than 49 percent (Congress 1969, p 3).

Discussion and Implications

My empirical analysis has demonstrates how policy-makers and interest groups can use arguments based in professional expertise to influence the institutions that govern inter-organizational relations. I have uncovered how such arguments operate along with tendencies towards formalization to shape institutions in two related industries. The results reveal that formal scripts and professional expertise are associated with two models for how to structure institutions. Formalization is a process that generates new and more detailed guidelines for how organizations could, and in some cases should, relate to one another. These processes were particularly salient in the SBIC industry where a large number of actors asked for stricter regulations in the wake of a number of industry scandals and high bankruptcy rates. Professionalization, in contrast, decentralizes the control over financing activities to groups of experts. Claims regarding expert controls where found in the SBIC industry, but even more so among the private venture capital firms. Investors asked for flexibility to design the ways that venture capital financing was organized. They did so by referring to their expertise in the field of risky small business investments.

The second part of my analysis has uncovered how participants in policy arenas can use formal scripts and professional claims to resolve differences in opinions for how

financing in small businesses should be organized. In the private venture capital industry, central actors were able to show how the financing tie between venture capitalists and small businesses can contribute to socially and economically valued categories including technological innovations, job creation, and international competitiveness. Thus venture capitalists' financing ties with small business become seen as public goods that not only benefited the venture capital firms and the company that received funds, but also contributed to collectively desired outcomes. Private venture capital firms claimed the right to share the returns of successful companies, based on the ability to absorb risk, provide long-term financing, and other services to the small business and by offering benefits to the society as a whole.

In the SBIC industry, tensions between firms' private interests and societal goals were harder to reconcile and organizations struggled for a long time to find ways to bridge different ideas for how SBICs should support the small business community. Unlike private venture capitalists' relations with small businesses, SBICs' relations became increasingly disentangled from other market arrangements and the relevance and professional basis of this financing arrangement was deeply questioned. With subsequent support from the state and mobilization in the financial community, SBICs continued to be involved in the financing of small businesses but as my analysis will show, the meaning shifted towards a more conservative view of how SBICs and small businesses should interact. These findings underscore that efforts to embed market relations in a societal context influence actors' ability to shape the meaning of ties.

At this point some comments about the theoretical implications of my work are appropriate. My analysis in this paper is focused on talk and arguments about inter-

organizational relations rather than the actual formation and management of ties. This approach to explaining network evolution differs significantly from many prior studies that predominately focus on which pairs of organizations are likely to form relations with one another and how those processes aggregate into global structures. I believe that research on about the institutions that govern inter-organizational relations is a valuable complement to traditional structural analyses that help us to understand why some relational arrangements are more likely to be observed in a market than others. My work seeks to explain how firms interact with policy-makers to shape regulations and other policies that subsequently influence firms' interactions with other firms. I find that firms' strategies for justifying claims in policy arenas have an effect on institutional developments. This finding has implications for research on the institutional context of inter-firms relations, since it show that firms themselves have a role in shaping that context. While future research definitely is needed to explain how regulatory changes affects firms' networks of social and economic relationships, I believe that my work takes steps toward a richer theoretical account of how institutions and inter-firm networks evolve over time.

Conclusions

Recent research in organization theory and economic sociology has directed our attention to the idea that firms' networks are institutionally embedded in cognitive understandings, norms and regulation. Studies show that institutional changes have significant implications for the properties of structural arrangements (Powell, White, Koput, and Owen-Smith 2005). Still little has been known about how and why such

institutions change. The analysis presented in the present paper starts addressing this theoretical gap by explaining how the institutions that govern inter-firm relations come into being. I use formal policy-making in the U.S. Congress as a window for understanding institutional emergence and change. In doing so, I also answer to calls for more research on the processes influence how relations in a network are organized in different markets and historical periods (Emirbayer and Goodwin 1994; Krippner 2001).

My findings show that representatives of interest groups and policy makers can use many different forms of arguments to shape the institutional context that govern firms' interactions. Especially my work emphasizes the importance of assertions grounded in professional expertise. Professional claims can solve tensions between firms' private interests and broader societal goals. These tensions are important in policy processes since regulators often need to satisfy many groups at the same time. This finding is interesting since it reframes a central discussion in organization theory and economic sociology about the relation between the economy and society (Krippner and Alvarez 2007). Whereas much research on network in market tend to view the social and the economic as distinct spheres, my argument points to the value of increased convergence between the network literature's conception of embeddedness (Granovetter 1985) and Polanyi's (1944) classical statement that markets needs to be understood as a part of society. I demonstrate that networks of inter-firm relations depend on their integration in accepted social orders.

CHAPTER 3: CAREER EXPERIENCES AND EMERGENT NETWORK STRUCTURES: INVESTMENT SYNDICATES IN THE YOUNG VENTURE CAPITAL INDUSTRY³

Abstract

The paper contributes to the literature on network evolution by examining how managers' prior career experiences shape firms' propensity to collaboration in a young industry. While prior network research has focused on the reproduction of relational patterns *within* mature industries, my study demonstrates that firms in young industries make decisions about collaboration based on their managers' experiences in *other* social contexts. Drawing on an analysis of the U.S. venture capital industry in 1970-1988, I demonstrate that firms with more commercial bankers preferred a model of sole investments despite a general trend in the industry towards more collaborative investments. The finding highlights the importance of a theory about network evolution that takes into account the differential understandings of collaboration as a means to explain why firms sort into differential network positions.

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Introduction

It is hard not to notice the important role that social and economic networks play in contemporary industries. The well-documented effects of networks on firms' outcomes (e.g. Ahuja 2000a; Davis 1991; Uzzi 1996) have recently motivated scholars to examine how relational patterns in an industry develop and change over time. In response to calls for a more historicized and dynamic network theory in the social sciences (Emirbayer and Goodwin 1994; Watts 2004), a new strand of research has identified a range of social and economic mechanisms that influence the formation and dissolution of network ties, including firms' attributes, existing relations, and physical location (for an overview see Rivera, Soderstrom, and Uzzi 2009). A common theme running across these studies is the idea that established industry arrangements tend to stabilize and perpetuate existing network structures (cf. White 1981). Because written contracts are incomplete (Macaulay 1963) and the value of collaboration depends on contingencies that are difficult to anticipate (Gulati and Higgins 2003; Mizuchi, Stearns, and Marquis 2006), firms often rely on information from their current partners (Gulati 1994) and shared informal understandings (Larson 1992; Owen-Smith and Powell 2004) when they make collaborative decisions. Firms' networks are therefore contingent on a history of past collaboration within the industry (Marquis 2003).

Yet not all industries have their own institutionalized history. Even if young firms in dynamic industries are those that benefit the most from affiliations with other firms (Baum, Calabrese, and Silverman 2000; Powell, Koput, and Smith-Doerr 1996; Stuart, Hoang, and Hybels 1999), current theoretical accounts offer limited insights into the

emergence of such relations. Young industries are fluid social structures where firms often carry a range of ideas for manage interactions with other organizations (Kreiner and Schultz 1993; Powell, White, Koput, and Owen-Smith 2005). They form therefore a context that forces us to move beyond current theories about network evolution to take into consideration why firms develop certain understandings of when collaboration is a valuable strategy. The objective of the present paper is to build an account for why some firms are more likely to form collaborative relations with competing firms, and why some firms resist collaborative strategies.

My argument highlights in particular the impact of managers' prior career experiences on emergent conceptions of network ties. This argument is inspired by literatures in organization theory and entrepreneurship which suggest that managers' prior experiences influence how firms conceive possible strategies (Boeker 1997; Fligstein 1990; Kraatz and Moore 2002). Managers' career experiences are especially important in locales and times when industry structures are not taken for granted (Fligstein 1990) such as young industries. Under these conditions, managers from different backgrounds tend to have diverging understandings of strategies and when they are appropriate to use. Drawing on these insights, I propose that managers' prior career experiences in other established industries influence firms' propensity to engage in collaboration with other firms. I conceptualize managers' prior career experiences as a set of cognitive frames that have important ramifications for the network of inter-firm relations that a firm develops over time.

In what follows, I develop my theoretical argument in an empirical analysis of why U.S. venture capitalists during the years 1970-1988 decided to work with other

venture capitalists, instead of making deals alone. Venture capital firms offer an important source of funding for start-up companies, and especially for entrepreneurial endeavors that break from existing practices and technologies (Gompers and Lerner 1999). Over time, U.S. venture capitalists' shared work on deals has generated a dense industry-wide network that is a channel for capital and information (Kogut, Urso, and Walker 2007). Today, firms depend on central positions in this relational infrastructure for their survival. Venture capital firms that work together in investment syndicates tend to have higher financial returns (Hochberg, Ljungqvist, and Lu 2007), and entrepreneurs that receive funds from central venture capitalists are more likely to experience successful public stock offerings (Megginson and Weiss 1991; Stuart, Hoang, and Hybels 1999).

Yet as Lerner (1994) has noted, venture capital firms' decisions to collaborate on investments represent a complex strategy that is driven by a range of different motives. Whereas the networks of the venture capital industry are today often viewed as natural and desired infrastructures that enable small businesses to survive and grow, a very different picture arise especially if we return to the early days of the industry. In the 1960s, the venture capital industry was still constituted by a set of loosely connected firms (Kogut, Urso, and Walker 2007) that frequently operated relatively independently of other investors. Syndicated deals among venture capitalists, while they existed, were by no means routinized practices and many firms resisted to engage in collaboration. My paper suggests that people with experience from commercial banking and investment banking were especially influential in shaping firms' propensity to collaborate with other firms on investments. For investment bankers collaboration in investment syndicates was

a well known strategy that they long had been used for deals related to large corporation. Commercial bankers in contrast were used to working alone when offering financing to companies. I anticipate that investment bankers and commercial bankers used these two distinct cultural understanding for how to pursue financial activities, which in turn lead their firms to develop different positions in the emerging network of co-investment relations.

Managers' Career Experiences and Emergent Network Structures

Researchers in the field of organizational theory have long recognized that young industries differ from mature ones. Organizational ecologists argue that firms in young industries face a special set of challenges, since other organizations are not familiar with their practices (Aldrich and Fiol 1994). Before the industry become a widely viewed as a recognized and legitimate market niche, organizations try out a multitude of business models, often without success (Hannan and Carroll 1992). Similarly institutional scholars have suggested that organizations in novel contexts often face competing models for how to organize their activities (DiMaggio 1991; Leblebici, Salancik, Copay, and King 1991). Network scholars, in contrast, have so far paid limited attention to the special nature of young industries. Indeed network theories have long been criticized for their excessively abstract and acontextual treatment of social structures (Emirbayer and Goodwin 1994; Krippner 2001; Sewell 1992).

Inspired by prior work, we can nevertheless expect that firms in young industries face a special set of challenges when interacting with other organizations. Studies have shown that firms with original practices and technologies often struggle to gain attention

and recognition from external stakeholders (Aldrich and Fiol 1994; Sine, Haveman, and Tolbert 2005). Other empirical works suggest that firms in novel contexts are frequently forced to change their collaborative strategies in response to factors beyond their own control, including technological breakthroughs, regulations, and competitive pressures (Madhavan, Koka, and Prescott 1998; Powell, White, Koput, and Owen-Smith 2005). Given these dynamics in the initial stages of an industry, we need to develop a more nuanced theoretical account of network dynamics. Theory should take into consideration that firms in young industries often face multiple competing pressures when they interact with partners. In the present paper, I move in this direction by highlighting how managers' prior career experiences shape collaborative decisions.

Managers' formal training and experiences is an important asset for young firms (Robinson and Sexton 1994). In addition to human capital in the form of expertise, their social connections offer a resource that the firm can draw on in its interactions with other organizations (Hallen 2008; Shane and Stuart 2002). Finally, and most importantly for my argument, managers bring with them capabilities that help firms to navigate and make sense of existing networks in an industry. Though managers' experiences are often not thought of as cognitive frames, they do guide how firms make collaborative decisions. Kogut (2000) has captured this argument nicely by proposing a model of networks as knowledge structures. A firm's participation in a network depends on its understanding of how cooperation is organized in an industry. Managers' prior experiences are likely to provide start-ups with access to these implicit rules.

Kogut's model presupposes that an industry is linked to a relatively bounded pool of managers who share norms for how organizations should collaborate with one another

to create value. This assumption is put into question by a stream of work in the field of entrepreneurship. Not all people in an industry come from the same background (Burton, Sørensen, and Beckman 2002), which by extension means that firms' often have diverging understandings of collaborative strategies. Diversity tends to be particularly high in young industries due to the limited group of people who possess industry specific experiences. Firms in newer and expanding industries are therefore often forced to compete with companies in other sectors for talented managers and employees with proper skill sets (Sørensen 2004). One by product of the competition for managers is that firms in young industries often employ managers with experiences from other sectors who carry distinct ideas for how to build relationships with other firms.

Thus as managers' move into new social domains, they alter incrementally the strategic tools that organizations in a young industry have available (Baty, Evan, and Rothermel 1971; DiMaggio 1991; Hwang and Powell 2009). Prior empirical work has found that managers' career backgrounds shape which opportunities firms identify and explore in the market place, including product offerings (Boeker 1997; Kraatz and Moore 2002). Fligstein (1990) takes this argument even further by claiming that the background of an organizations' executives influence the very mindset that exist in an organization. Prior experiences shape the means that managers use to diagnose problems, identify solutions, and implement change. My research draws on Fligstein's work on how career backgrounds can influence decisions about corporate strategies. I expect that strategic decisions about when and how to collaborate with other firms should depend on the experiences that managers bring with them into firms. Managers' backgrounds influence what business relations are seen as viable and desired. Such imaginative capacities are

complements to practical concerns and collective habits (Emirbayer and Mische 1998). By turning to an analysis of the venture capital industry, I will next elaborate on my general theoretical proposition and develop my hypotheses.

Venture Capitalists' Experiences in Traditional Finance

The first U.S. venture capital firms were formed after the end of World War II. These firms were organized efforts to explore opportunities in a market niche that historically had been dominated by wealthy individuals (Gupta 2000; Hsu and Kenney 2005; Reiner 1989). The first generation of venture capital firms was a mixed group of organizations managed by founders who had “unusual backgrounds and goals” (Reiner 1989, p 126). Many of the pioneering venture capital investors were strongly influenced by the war experience, excited about new technologies, and committed to the development of local communities (Gupta 2000). They often had limited experience in professional investing, and entered into small business financing after careers in universities, government agencies, manufacturers, law firms, and their own start-ups (Gupta 2000). Personal taste played an important role and venture capitalists explored a multitude of investment styles to grow start-ups into established and profitable corporations. Deals were made in expanding technological markets such as aviation, chemicals, and electronics, but also in other niches that today are less associated with venture capital such as film, real estate, and frozen food (Bygrave and Timmons 1992; Reiner 1989).

Initially the traditional financial community saw venture capital investments as a peripheral and sometimes even obscure activity. These patterns began to change in the

late 1960s, when people with experience in investment banking and commercial banking showed increased interest in venture capital and a large number of new firms were founded. Two factors explain why people from traditional financial sectors became involved in venture capital in this period. First, during a time of booming stock markets, bankers were looking to explore new market segments, and small business investments was one area where banks had relatively limited presence since the great depression in the 1930s. Second, the passing of the Small Business Investment Act in 1958 made it attractive for banks to form independent venture capital subsidiaries, since such subsidiaries could leverage private funds with federal loans (Noone and Rubel 1970). In 1971, venture capitalist Charles Lea, Jr. described that the entry by people from major financial institutions into venture capital had generated significant innovations in the industry. Venture capital firms, Lea stated, were increasingly managed by professional staffs able to “assess and measure the risks and probabilities in a situation more rapidly and with greater technical efficiency than ever before” (Lea 1971, p 298).

Throughout the 1970s and early 1980s, venture capital firms explored and adopted several investment techniques, and a distinct venture capital model started to take shape. One aspect of this model was firms’ increased involvement in investment syndicates. An investment syndicate is a group of venture capital firms that makes a deal together in a company. The deal is usually structured by a lead firm which organizes the syndicate. Historical evidence suggests that the practice of syndicated investments has been used by venture capital firms since the 1948 when American Research & Development (AR&D) and Rockefeller Brothers together made an unsuccessful investment in a start-up business working on canned tuna (Ante 2008). But as I will

demonstrate in my result section, the frequency with which venture capital firms syndicated deals in the 1970s and early 1980s was something that previously had not been seen in the industry. As a result, venture capital firms became tied together in a large network of co-investment relations.

I expect that several factors contributed to firms' engagement in investment syndicates. Financial constraints and the move towards capital intensive industries were clearly important factors that pushed venture capital firms to pull resources into syndicates in order to make investments. Moreover, I anticipate that firms' propensity to collaboration in investment syndicates depended on their managers' prior career experiences in banking. Investment syndicates had long been a common practice in the field of investment banking. Lerner (1994), for example, has pointed out that banks had collaborated on stock underwriting before the venture capital industry even was established. One early example of a syndicated deal among banks cited by Lerner was the Pennsylvania Railroad's stock offering in 1870. After the passing of the Glass-Steagall act in 1933 which separated between investment banking and commercial banking, the practice of syndication survived among investment banks as a means to spread risk, gain access to valuable information, and share monitoring responsibilities. Thus for venture capitalists with experience in investment banking, the idea of syndicating deals with other firms was a well known strategy.

Commercial bankers had in contrast developed a different model of making financial deals. They typically preferred to work with companies associated with lower financial risks. They made deals alone instead of working in syndicates with competing firms. When commercial bankers entered into venture capital financing, they brought this

mindset to the new industry. Reiner (1989, p 392) cites an interview with David Arscott who was a leading venture capitalist with experience from the world of commercial banking: “The process [of evaluating venture capital deals] is not radically different from the classical investment analysis process [...] If we decided it was good, we would do an analysis of the management’s background, its customers, suppliers, bankers, auditors, attorneys, and others involved with the company [...] I don’t think there is anything magical about that process. You analyze the financial information that is presented and possibly develop some other scenarios... The classical elements haven’t changed.”

I expect that people with experiences from investment banking and commercial banking brought to understanding of how to do investments into venture capital. Venture capital managers with experience from investment banking were likely to perceive uncertainty before them and engaged in syndicated deals as a solution, since syndicated deals long had been used in investment banking. Accordingly, I expect that venture capital firms managed by investment bankers have a higher likelihood than other firms to form investment syndicates. Managers with experience from commercial banking in contrast were used to a model where they offered financing alone. I expect that firms with such managers were less likely than other firms to engage in investment syndicates despite a general trend in the venture capital industry towards more collaboration. I suggest the following two hypotheses:

Hypothesis 1 (H1): Venture capital firms with more managers from investment banking had a higher propensity to syndicate investments with other venture capital firms

Hypothesis 2 (H2): Venture capital firms with more managers from commercial banking had a lower propensity to syndicate investments with other venture capital firms

Data and Method

To test my predictions about the impact of managers' career experiences on firms' decisions to cooperate, I constructed a longitudinal dataset based on multiple data sources. I obtained data on venture capital firms from the VentureXpert database. My analyses include all firms that have made at least one investment in a U.S based company. For the purpose of this study, I focus on data for the years 1970 to 1988. Prior network research about this industry (Kogut, Urso, and Walker 2007) as well as historical accounts (Reiner 1989) suggest that this period is critical for understanding how contemporary patterns of co-investments were established. In this time, many venture capital firms were founded and many practices that are used in the industry today took shape. The financial crisis by the end of the 1980s demonstrated the institutionalization of the industry as well as the relative robustness of the newly developed network structures.

The dependent variable for my analysis is a measure of firm's propensity to syndicate deals in each year. Each venture capital deal is structured by a lead investor. The lead investor decides, among other things, whether or not to invite other firms into an investment syndicate. For each firm and year, my dependent variable is calculated as the share of deals with the firm as a lead investor that was syndicated with other firms. Following work by Sorenson and Stuart (2008), I use two criteria to define the lead

investor in each company. First, firm is treated as the lead investor if it was the only firm involved in the first venture capital round. Second, if more than one venture capital firm was involved in the first round, I define the lead investor as the company that invested in all investment rounds before the company went public, was acquired or went bankrupt. I exclude cases where no lead investor could be identified based on the two criteria.

To assess my hypotheses about the effect of manager's prior career experiences on firms' propensity to collaborate, I collected data on all officers and general partners of the venture capital firms in my sample. Officers and general partners were identified from Pratt's Guide to Venture Capital Sources published in 1970-1987 (1st to 11th edition). Firms without listings in the Pratt's Guide were excluded from my analyses. Data on these managers' careers were subsequently coded from Who's Who in Venture Capital (1st to 3rd edition), Marquis Who's Who database, and biographies that insiders have filed with the Securities and Exchange Commission. The resulting dataset includes close to 15,000 prior affiliations of venture capital managers. These data provide a unique source for understanding how early venture capitalists moved across organizational affiliations inside and outside the industry. Based on these data, I code a manager as having prior experience in banking if the person had at least one prior position, aside from summer internships, in an investment bank or a commercial bank. For each firm and year, I construct two variables: the number of people with experience in investment banking and the number of people with experience in commercial banking. I use these variables to test my two hypotheses that firms with managers from investment banking were more likely to syndicate investments than other firms, and that firms with managers from commercial banking were less likely to syndicate investments. All statistical models control for the

number of managers associated with the firm in that year to account for the fact that firms vary in how many managers they have.

All models also include several control variables that are likely to explain why a firm chose to collaborate instead of investing alone. An important alternative explanation for why venture capital firms engage in investment syndicates relates to resource constraints. Investment syndicates, this functional argument suggests, are means for venture capital firms to pool capital and make investments that they could not make without the support of other firms. To account for the effect of resource constraints, I create a variable that measures the age of youngest fund managed by the firm. Firms typically use the capital in a fund during the early years of the fund's life span to make investments. I therefore expect that firms with older funds are more likely to face capital constraints and hence also more likely to invest with partners. I also include a variable for average investment round to control for resource constraints. Venture capital firms are known to be more likely to syndicate investments in later stages since those rounds often require more capital. Moreover firms that participate in earlier rounds have an incentive to invite additional firms in subsequent rounds to a premium price (Gompers and Lerner 1999).

I also expect that a firm's propensity to collaborate depends on its recent track record of investment success. Venture capital firms can generate returns in two forms of liquidity events. First, the investment becomes liquid when the company that received financing becomes publically traded via an initial public offer (IPO). Second, an investment becomes liquid when a company is acquired by another company. For each firm and year, I calculate the number of liquidity events as the sum of IPOs and

acquisition in the firms' investment portfolio in the period year. The variable is highly skewed and I take therefore the natural logarithm of this measure before including it into my analysis.

I further include a set of variables that measures the firm's investment profile. I control of the degree to which the firm is an industry generalist with an inverse Herfindahl index. The Herfindahl index sums the squared proportion of investments in each of the eighteen two-digit level VEIC industries over the prior ten years. The index ranges from 1 to k , where k denotes the number of industries. Firms with high values of the index are industry generalists whereas firms with lower values are specialists. I also control for the extent to which the firm invests in capital intensive industries to take into account industry focus and constraints stemming from a large share of investments in capital intensive industries. I operationalize the idea of industry effects by including two variables that measures the share of the firm's total investments that were made in information technology (including hardware) and medicine/health. The reference category for the industry variables is the proportion of investments in non-high technology industries, such as transportation and consumer related goods. Prior research also suggests that the venture capital industry is characterized by large regional variations (Castilla 2003). I control for the effect of geographic embeddedness by measuring the proportion of investments made by a venture capital firm in each geographic region during the prior ten years. I group investments into three geographic categories: West Coast, Northeast, other regions (including Southwest, Southeast, Mid-Atlantic and Midwest).

I also control for the firms existing position in the network. Prior research on network evolution has highlighted that firms that are better positioned in the existing network structure are more likely to collaborate in subsequent years since they have routines for collaboration in place and since they have access to information about possible collaborators (Gulati 1994). Central firms are also likely to be attractive as collaborators since a firms' current network positions offers a signal of status and quality (Podolny 2001). To control for this effect, I constructed a network of prior co-investments between venture capital firms. Two venture capital firms have a tie in this network if they have made an investment in the same portfolio company. In contrast to my dependent variable which predicts if a firm enters a new investment syndicate, the network data reflect the history of co-investments in the venture capital industry. A tie lasts until the investment is liquidated through an acquisition or initial public offering. For cases with missing end dates, I assume that the investment lasts for ten years since many funds are time-limited and liquidated after that time⁴. From these data, I calculate network centrality with an eigenvector construct. Eigenvector centrality takes into account both a focal firm's number of partners and then the centrality of these partners. The resulting index reflects the firms' position in the global network structure, and it is often used to measure the extent that a firm can leverage its structural position to gain information, power, and status benefits (Freeman 1978/1979). The network centrality

⁴ To confirm the validity of the ten-year cut off, I tested the likelihood that a firm made an investment t years after its last investment. After ten years of inactivity, the probability that the firm invests in a company approximates 0.005 relative to a firm that made an investment in the most recent year.

measures were calculated with the *igraph* package in R using yearly cross-sections of the relational dataset.

From these data, I estimate the propensity to syndicate deals for each firm and year. I use a set of Heckman selection models, since firms differ in their likelihood to make any deals as a lead investor and since investment activities tend to be clustered in time with no investments made in some years. The first stage of my models (the selection stage) estimates the likelihood that a firm makes any deals as a lead investor in a year. The major variable in this part of the model is the time since the firms made its most recent investment. After raising a new fund, venture capital firms typically enter into phase when they scout new deals and make investments. Firms in this stage tend to have more capital available which makes it more likely to be a lead investor. After this period, the fund's managers focus instead their attention on supporting their portfolio companies and moving them towards public offerings or acquisitions (Gompers and Lerner 1999). I therefore expect that duration since the most recent investment is a good variable for predicting the probability that a firm will structure a new investment as a lead investor. I also include my variable for liquidity events since firms with higher performance tend to have more capital to generate new deals. I also include my variables for generalist and network status since firms that invest in a large number of industries and that have high status are more likely to learn about new investment opportunities.

Thereafter, the second stage of my models estimates the proportion of those investments that were made in a syndicate conditional on the likelihood that the firms made any investments as a lead investor. To reduce concerns about the temporal priority of my predictors, I lag all independent variables by one year. I also include year fixed

effects in both stages of my models to control for the effect of economic, political, and legal climate on firms' investment practices. Table 3.1 and Table 3.2 show descriptive statistics and bivariate correlations for all variables included in my analyses.

Table 3.1 Descriptive Statistics

Variable	Mean	S.D.	Min	Max
(1) Syndicated investments (in %)	0.310	0.368	0	1
(2) Age youngest fund	1.174	0.983	0	3.638
(3) Average investment round	1.076	0.223	0.693	1.833
(4) Liquidity events	0.592	0.656	0	3.178
(5) Generalist	1.572	0.444	0	2.408
(6) IT (incl hardware)	0.509	0.245	0	1
(7) Medicine	0.124	0.157	0	1
(8) Northeast	0.246	0.244	0	1
(9) West Coast	0.337	0.293	0	1
(10) Status in network	-3.993	2.491	-13.816	-1.347
(11) Number of executives	3.090	2.878	1	24
(12) Time since last investment	0.130	0.621	0	8
(13) Investment bankers	0.630	1.336	0	15
(14) Commerical bankers	0.512	1.062	0	11

Table 3.2 Bivariate Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Syndicated investments (in %)	1.00												
(2) Age youngest fund	-0.20	1.00											
(3) Average investment round	0.29	-0.23	1.00										
(4) Liquidity events	0.16	-0.12	0.41	1.00									
(5) Generalist	0.01	0.14	0.12	0.25	1.00								
(6) IT (incl hardware)	0.27	-0.23	0.50	0.23	-0.02	1.00							
(7) Medicine	0.07	-0.14	0.07	0.00	-0.25	-0.28	1.00						
(8) Northeast	-0.04	0.15	-0.04	0.04	0.05	0.03	-0.10	1.00					
(9) West Coast	0.27	-0.26	0.37	0.17	-0.10	0.46	0.05	-0.41	1.00				
(10) Status in network	0.19	0.04	0.44	0.34	0.43	0.36	-0.13	0.07	0.26	1.00			
(11) Number of executives	0.19	-0.19	0.38	0.36	0.18	0.21	0.01	-0.04	0.16	0.24	1.00		
(12) Time since last investment	-0.12	0.11	-0.23	-0.16	-0.37	-0.11	-0.02	0.04	-0.09	-0.28	-0.12	1.00	
(13) Investment bankers	0.09	-0.14	0.17	0.20	0.14	0.11	0.01	0.01	0.12	0.13	0.50	-0.05	1.00
(14) Commerical bankers	-0.01	-0.07	0.14	0.15	0.14	0.04	-0.07	0.00	-0.07	0.06	0.50	-0.04	0.17

Results

As already proposed, venture capital firms were in the 1970s and early 1980s increasingly investing in syndicates instead of making deals as sole investors. Figure 3.1 is based on my dataset and it shows the annual proportion of deals that were syndicated among two or more firms. The figure confirms the historical evidence that syndicates, while they existed before, increased in frequency during the 1970s. In the mid-1980s, around half of all venture capital deals were made by investment syndicates instead of individual firms.

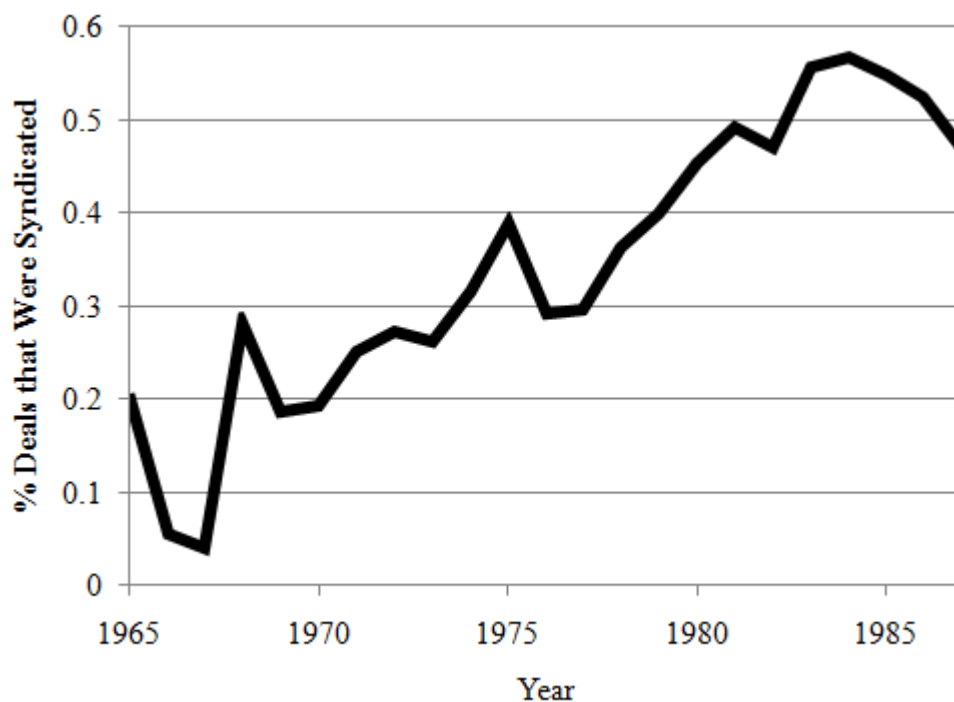


Figure 3.1 Annual Proportion of Syndicated Deals, 1965-1987

In Table 3.3, I present results from the analysis of differences in firms' propensity to invest in syndicates. I assess the statistical significance of associations with a conventional two tailed 95 % confidence interval. The lower panel of Table 1 shows the effects on the likelihood that the firm made any deals as a lead investor. I find as expected a string effect of the duration since the firm's most recent investment. Firms with more years since their last investments are significantly less likely to make any deals as a lead investor. I further find support for the arguments that firm's are more likely to act as lead investors when they have higher financial performance, are industry generalists, and have higher status in the existing network.

Against that background, consider the upper panel of Table 3.3 which estimates the propensity of a firm to syndicate investments conditional upon making any deals as a lead investor. Model 1, which presents the effects of the control variables on the probability that a firm invests together with partners. This model provides partial evidence for the functional idea that venture capital firms enter syndications in response to resource constraints. As funds become older, firms tend to have less capital available for investments. Model 1 shows that firms with older funds are more likely to syndicate deals which can be explained by the limited capital available for making investments. The results show that firms with a high proportion of investments in the IT sector, relative to non high-tech sectors, are more likely to form investment syndicates. The IT sector includes capital intensive industries such as hardware and semiconductors, and the finding thus indicates that syndicates may be the result of firms' need to pool funds.

Table 3.3 Estimated Effects on a Firm's Probability of Investing with Partners, 1971-1988

	M1	M2	M3	M4
Age of youngest fund	-0.023 + (0.013)	-0.023 + (0.013)	-0.023 + (0.013)	-0.024 + (0.013)
Average investment round	0.000 (0.089)	0.000 (0.089)	0.002 (0.089)	0.001 (0.089)
Liquidity events	-0.020 (0.022)	-0.020 (0.022)	-0.020 (0.022)	-0.020 (0.022)
Generalist	-0.030 (0.036)	-0.029 (0.036)	-0.026 (0.037)	-0.024 (0.036)
IT (incl hardware) †	0.155 + (0.082)	0.155 + (0.082)	0.152 + (0.081)	0.152 + (0.081)
Medicine †	0.140 (0.092)	0.141 (0.092)	0.123 (0.092)	0.124 (0.092)
Northeast ††	0.065 (0.057)	0.066 (0.056)	0.058 (0.057)	0.060 (0.057)
West Coast ††	0.183 ** (0.056)	0.184 ** (0.056)	0.166 ** (0.056)	0.168 ** (0.056)
Status in network	0.015 ** (0.005)	0.015 ** (0.005)	0.015 ** (0.005)	0.015 ** (0.005)
Number of executives	0.008 (0.005)	0.009 (0.006)	0.014 * (0.006)	0.015 * (0.006)
Investment bankers		-0.003 (0.010)		-0.006 (0.010)
Commerical bankers			-0.030 * (0.013)	-0.031 * (0.013)
Constant	0.368 * (0.144)	0.365 * (0.144)	0.366 * (0.143)	0.361 * (0.142)
<i>Any deals as lead investor</i>				
Time since last investment	-0.190 *** (0.046)	-0.190 *** (0.046)	-0.190 *** (0.046)	-0.190 *** (0.046)
Liquidity events	0.426 *** (0.083)	0.426 *** (0.083)	0.426 *** (0.083)	0.426 *** (0.083)
Generalist	0.645 *** (0.097)	0.645 *** (0.097)	0.645 *** (0.097)	0.645 *** (0.097)
Status in network	0.044 + (0.023)	0.044 + (0.023)	0.044 + (0.023)	0.044 + (0.023)
Constant	-0.794 ** (0.254)	-0.794 ** (0.254)	-0.794 ** (0.254)	-0.794 ** (0.254)
N	2337	2337	2337	2337
LL	-1625.145	-1625.082	-1621.700	-1621.497

Clustered standard errors within parentheses. Both stages control for year fixed effects. + p<.1, * p<.05, ** p<.01, *** p<.001 (two tailed tests) † = Reference category = investments in non-high technology (%) †† = investments in other regions (%)

Another alternative explanation for firms' propensity to collaborate focuses on the culture of different geographic regions. I find that firms on the West Coast are significantly more likely to make investments in syndicates than firms in the other regions (excluding Northeast). Interestingly, there is no significant difference between firms in the Northeast and other U.S. regions despite the fact that the area around Boston was one of locales which large number of early venture capital firms. Finally, I find in Model 1 support for the idea that firms' propensity to collaborate is influenced by their status and centrality in the network of prior collaboration. This finding is in line with work that suggests that network evolution is an endogenous process where firms use their current ties to search for information about new collaborators (Gulati 1994). Consistent with prior work, I find that firms in central network positions are more likely to enter into investment syndicates. This finding extends the existing literature by suggesting that structural path dependencies are also important in young industries where networks are emergent and rapidly changing.

Model 2-4 test my hypotheses by introducing the variables for how many managers the firm has from investment banking and commercial banking. I predicted in my first hypotheses that firms with more managers from investment banking have a higher propensity to collaborate on investments. I find no support for this idea in my analysis. Firms with more investment bankers were not more likely to collaborate on deals despite the fact that investment bankers had been using syndicates in other contexts for a long time.

My second hypothesis predicted that firms with more managers from commercial banking are less likely to syndicate deals. I argued that managers with experience from

commercial banking were used to a financial model where syndicates were not a major component. Since managers are likely to use practices that they have experience with in other contexts as they enter new industries, I expect firms with more commercial bankers to be less likely to syndicate deals with other firms. Model 3 and 4 offers empirical support for this hypothesis.

To summarize, the general idea that manager's career experiences influence firms' propensity to collaborate with other firms receives partial support. Investment bankers did not make firms more likely to collaborate. Firms with the highest propensity to collaborate on investments were those with a high share of investments on the West Coast and central positions in the existing network of co-investment relations. I find, however, that more managers with experiences from commercial banking made firms less likely to collaborate on investments. In a period when firms increasingly collaborated with other firms, firms with more commercial bankers tended to choose a different path. They were less likely to engage in syndicates, and developed therefore fewer connections to other firms in the industry.

Discussion and Implications

I demonstrate in this paper how a network of co-investing firms was established in the venture capital industry. The analysis extends prior research on the evolution of networks by taking into account the special processes that influence emergent structures in young industries. The results provide some evidence for the proposition that firms' decisions of whether or not to cooperate with partners are contingent on managers' backgrounds in other established industries. These decisions about whether or not to

collaborate had important implications for individual venture capital firms, entrepreneurial start-ups, and the industry as a whole. Figure 3.2 and Figure 3.3 below illustrate the aggregate outcome of venture capital firms' involvement in investment syndicates. The network diagram in Figure 3.2 shows the network of co-investments in 1969. The circle-shaped nodes represent venture capital firms, and the lines between the nodes represent collaboration on investments. In the 1960s, the venture capital industry was still relatively small. Despite few firms, a factor that tends to increase the likelihood of a cohesive industrial community, the network was still very sparse. This network diagram can be understood in contrast to the industry's structure less than twenty years later. Figure 3.3 illustrates the patterns of co-investing venture capital firms in 1986. In this year, 94.9 % of all venture capital firms were interconnected in a large network component. 25.2 % of the co-investment ties between venture capital firms can be classified as strong connections in the sense that the two firms worked together on more than one startup company. Venture capital was by this time a relatively established area of financial activity. Several well-known venture capital backed start-ups, including Microsoft, moved from private equity financing to public capital markets in 1986, producing the success that the venture capital industry is now known for.

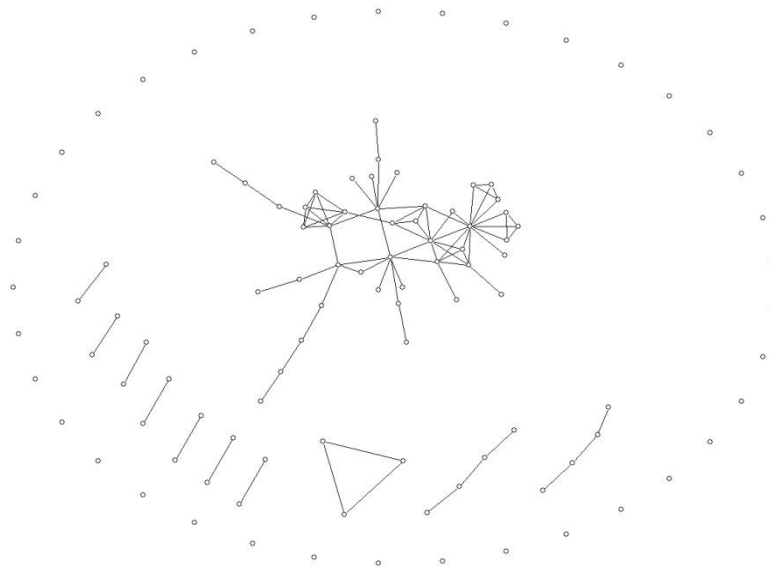


Figure 3.2 The Network of Co-Investing Venture Capital Firms in 1969

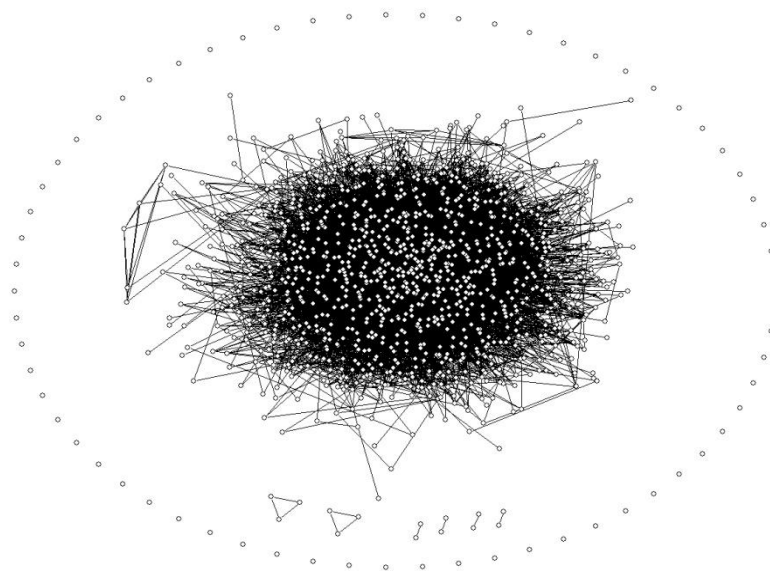


Figure 3.3 The Network of Co-Investing Venture Capital Firms in 1986

The analyses discussed in this paper focus on networks as they emerge from organizational-level decisions. As argued in the introduction, organizations' decisions of whether they will cooperate comprise one of two important processes for understanding how inter-organizational networks develop. The second process concerns the choice of partners. This question will be analyzed in Chapter 4, but it is also important to keep in mind when interpreting the results that I have presented. I expect that the pool of possible partners may influence a firm's decision of whether or not to cooperate. Firms' internal and unobserved threshold for forming ties is likely to be lower when they operate in industries with many attractive collaborators. The decision of whether a firm will cooperate with others is therefore not completely independent from the choice of partner. To some degree, I control for the pool of available partners with the yearly dummy variables. This control variable assumes, however, that all firms in a given year have homogenous preferences when it comes to partner selection. This assumption can especially be called into question in young and heterogeneous industries. Future research is thus needed to better understand how dyadic partner choices interact with organizational-level choice regarding cooperation.

Another scope condition of my paper concerns the focus on young industries. My historical analysis of venture capital firms was theoretically motivated by an interest in understanding how patterns of business relations take shape when the practices and beliefs that guide collaboration cannot be assumed to be shared among firms. I have presented some evidence for the idea that managers' career backgrounds influenced the conditions under which venture capital firms entered into collaboration in the period 1970-1988. This insight opens up a new set of questions that future research on network

dynamics need to consider. For research on networks in young industries, my study implies that we need to better understand the conditions under which people from a particular background become influential in a network. Abbott's (1988) ecological theory, for example, stresses that groups with professional aspirations often have to fight intense struggles before they gain control of new task domains. Following his insight, I expect that managers' influences on relations between firms often are highly political processes. Consider, for example, the results from Chapter 2. A series of debates in the U.S. Congress in the mid-1960 and 1970s addressed the extent to which venture capital firms' investment practices should be regulated by formal law or professional norms. In these debates, investors tried to achieve control over deal structures by linking their personal goals to larger social projects including economic growth, job creation, and innovation. Proponents for changed rules, in contrast, argued that venture capitalists were too risk seeking to be supported by federal means. I anticipate that politics of this form is crucial for understanding how inter-organizational relations develop in young industries.

My findings also raise a set of questions about how idiosyncratic the U.S. venture capital industry may be compared to other social contexts. It is important to keep in mind that my analyses are limited to one industry and one form of relations that can exist between firms. I present in this sense a case study that documents one out of many possible trajectories of network evolution. My intention has been to propose an argument that can be tested and modified in future studies. Industries in other national and historical contexts are particularly good candidates for subsequent comparative analyses about the conditions under which different groups of managers are able to shape the patterns of relations that develop in an industry. When we understand how relational

patterns emerge in a range of diverse settings, then we will have made important progress towards a general theory about network dynamics.

Conclusions

In this paper, I have engaged ideas from economic sociology, management and strategy to explain how social structures emerge in young industries. I speak to these literatures by documenting how one core aspect of an industry– the pattern of inter-organizational collaboration – develops and takes hold. I show specifically how firms’ practices with respect to collaboration can derive from managers’ experiences in other industries. This finding holds important implications for current theories on the dynamics of inter-organizational networks.

Firstly, my work contributes to theory by highlighting how factors outside an industry are important for networks in any particular industry. This insight extends prior research which has assumed that industries are demarcated spheres of social and economic life. Compared to the existing focus on the mechanisms that reproduce network patterns *within* an industry, I recognized the role of influences *across* social contexts. For young industries especially, reconciling this tension between seeing industries as at the same time meaningfully bounded entities and also as permeable fields is crucial for understanding how new structures develop. My paper moves therefore beyond the more restricted model of path dependency that has guided prior research on how networks evolve over time. I emphasize in contrast that networks among firms can develop in many different trajectories. I find partial support for the idea that current relations matter, but more importantly my results suggest that firms engage in cooperation under very

different conditions. In young industries especially, we need to pay attention to the range of ideas and practices that shape firms' collaborative decisions, including those held in other industries that are tangential to the one in question.

Secondly, I contribute to theory by emphasizing the role of manager's career experiences for emerging network structures. My study demonstrates especially that managers can carry ideas about cooperation from one industry to another. A few prior studies have argued that networks depend on firms' current knowledge basis and learning capabilities (Gulati 1999; Kogut 2000). I build on these ideas to show how managers from other social contexts may provide a normative and intellectual foundation for emergent networks. Managers give organizations access to an established and recognized body of knowledge that can be used for structuring collaboration with partners. This finding stresses that network evolution cannot be understood apart from the institutions that infuse relations with meaning. The result implies that more attention should be directed towards the normative meaning systems in which relations are embedded.

Finally, my results hold important implications for policy-makers. The practice of syndicated investments is indeed just one of many possible ways for venture capital firms to structure a deal. Yet once venture capital firms started to collaborate, the emerging network structures offered new pathways for information and capital flows. The network of co-investments has therefore ramifications for how entrepreneurial communities are supported. My emphasis on network emergence widens the range of tools that policy-makers have available to build a structurally cohesive venture capital industry capable of funding different forms of entrepreneurs and entrepreneurship. By highlighting the role of knowledge structures, I emphasize that the generation of a robust investor community do

not only requires a favorable economic context, but also a social environment conducive to learning. New means for funding entrepreneurship can become sustainable arrangements if they align with norm systems and receive support from leaders in the new industry.

CHAPTER 4: THE EFFECTS OF INTEGRATING AND DIFFERENTIATING INSTITUTIONAL PRESSURES ON NETWORK STRUCTURES: TRADE ASSOCIATIONS AND THE EVOLUTION OF INTER-FIRM COLLABORATION

Abstract

Shared institutional contexts are known to increase the likelihood that pairs of individuals or firms form collaborative relations. I extend this idea by theorizing that institutional pressures towards structural integration are accompanied by strong pressures towards differentiations, since institutions tend to be organized around their members' collective goals as well as their individual characteristics. An empirical analysis of the venture capital industry shows that the positive effect of shared membership in trade associations on collaborative investments between firms is mitigated by firm differences in geographic focus, targeted clients, and status. The findings imply that institutions foster cohesive networks among similar members, but they simultaneously conserve differences between sub-communities in the field.

Introduction

Understanding the origins of cohesive networks of social and economic relations is of keen theoretical and practical importance. Structural cohesion is known to explain individuals' (McAdam 1986) and organizations' (Mizruchi 1992) propensity to engage in collective action, and the levels of creativity and innovation that exist in a field (Uzzi and Spiro 2005). Nevertheless, even in very cohesive fields such as academia, social networks do not unify all members (Moody 2004). Cohesion is typically highest within culturally and politically homogenous clusters, whereas connections tend to be rare between dissimilar individuals or organizations (Watts 1999), despite such connections' importance for information flows (Burt 1992; Granovetter 1974). Thus, an explanation for how cohesive networks emerge requires an account of two simultaneous processes: First, what are the processes that integrate members of a field and make them more likely to form relationships with each other; and second, what are the processes that separate between social groups with different characteristics.

So far most research on structural cohesion has focused on the question of integration. There is an old idea in the social sciences that the level of cohesion in a society depends on the presence of shared institutional contexts (Durkheim 1933). Field-wide institutions function as collective "foci" that facilitate the development of social bonds by generating opportunities for new encounters and by making people engaged in collective endeavors (Feld 1981). Empirical studies find, for example, that college students are more likely to form ties with each other when they are in the same extracurricular activities (Rivera 2010) and classes (Kossinets and Watts 2006; Kossinets

and Watts 2009), that mothers with children in the same daycare center are likely to support each other and become friends (Small 2009), and that economic relationships among financial firms depend on shared investment objects (Sorenson and Stuart 2008). The belief that shared institutions can foster collaboration between otherwise separated groups is also reflected in the structures of many contemporary policy initiatives. For instance, interdisciplinary consortia are organized in the sciences to push research frontiers, and alliance of governments, firms, and nonprofit organizations have been established in the fields of global health and the natural environment to solve complex issues such as high childhood mortality rates and global warming.

Current accounts for how shared institutions influence collaboration have, however, one major weakness. I find this weakness important to address, since it has large implications for our understanding of how social networks evolve, especially in fields with diverse participants. In what follows, I argue that prior research on the effect of institutions on collaboration accurately have captured the integrative power of institutions, but often incorrectly downplayed that institutions also are sources of social differentiation and stratification. I will demonstrate that the positive effect of shared institutional contexts on collaboration only holds when two members already share key characteristics that define their identity in the field. The finding implies that institutions foster cohesion among similar members, but importantly they also reproduce distinctions between different sub-communities.

My theorizing centers on the idea that integrating and differentiating pressures co-exist inside institutions. I propose that the two pressures origins from institutions' dual organizational goals. On the one hand, members of an institution strive to be part of a

community, which means that many activities speak to boundary-spanning problems and shared cultural understandings. This perspective is found in studies on collective foci and networks, which traditionally have focused on institutions ability to highlight commonalities (Feld 1981). Yet, on the other hand, members of an institution also seek to find roles that speak to their unique interests, which means that they are not equally involved in collective activities. For example, a group of prior sociological studies have shown that in institutions ranging from technical committees to professional groups, distinctions among members are important for understanding how decisions are made and how tasks are carried out (Abbott 1988; Ahrne and Brunsson 2008; Farrell and Saloner 1988; Galaskiewicz 1985). Since integrating and differencing pressures of these types often operate at the same time, I propose that institutional pressures often come with tensions and tradeoffs that need to be examined in order to understand how institutions affect the formation of social and economic relationships.

In support of my argument, I present in this paper an empirical analysis of how venture capital firms' shared membership in trade associations affect their propensity to collaborate on investments. Prior research has documented that venture capital firms are deeply embedded in networks of jointly made investments in entrepreneurial companies. Understanding how those structures formed is critical since venture capital firms' positions in the co-investment network influence their investment decisions (Sorenson and Stuart 2008) and their financial performance (Hochberg, Ljungqvist, and Lu 2007). In brief, the empirical results show a positive effect of shared membership in trade association on the likelihood that firms collaborate. The effect becomes, however, significantly weaker when firms have different positions in the industry. When two firms

pairwise difference -- measured as overlaps in targeted clients and status differentials -- are one standard deviation above the mean, shared membership in trade associations have no longer an effect on the likelihood that the firms form collaborative relations with each other.

These empirical findings highlight the general argument of this paper: members of a field are not equally influenced by their participation in institutional arenas. This finding holds important implications for theorists and policy-makers alike, especially those who are interested in bringing together disparate groups. My empirical study demonstrates that differentiation occurs in a set of institutions where the members are more similar to each other than the average members of the population. If differentiating forces play a role in homogenous institutions like the trade associations in the venture capital industry, we can expect that differentiating forces are even more important in diverse institutions where the interests of individual members are harder to align. My work indicates that people involved in the design of these institutions need to overcome strong social mechanisms to reach their goal of generating more collaboration between existing social cliques. The presence of institutions that bring together diverse people and organizations is not a sufficient condition that will not ensure that networks in the field become more diverse. Institutions with diversity goals must also find mechanisms that overcome pressures towards differentiation.

Trade Associations and Collaboration among Firms

The institution in focus of my analysis is trade associations. Trade associations can be defined as private governance orders that are based on negotiations among a set of

member firms (cf. Campbell, Hollingsworth, and Lindberg 1991; Schneiberg 1999), and they have often been depicted as a strong integrating force within economic fields. Research on governance mechanisms and new technologies have stressed the coordinating and standardizing functions of activities in trade associations (Brunsson and Jacobsson 2000; Farrell and Saloner 1988). Studies have found that trade associations are important in a range of domains, and especially those with technological independencies including communication (Rosenkopf and Tushman 1998), transportation (Chandler 1977), and utilities (Granovetter and McGuire 1998) since firms in such industries have an interest in shared guidelines that facilitate distribution and ease consumers' adoption of the technology. Scholars interested in the political aspects of markets have also paid attention to the coordinating role of trade associations. In this literature, trade associations are understood as interest groups that firm can use to mobilize collective action and influence the structures of an industry (Fligstein 2001; Schneiberg 1999).

Aside from technological coordination and political mobilization, trade associations are also well-known as contexts for networking. A trade association can in this sense be thought of as a collective institution that bring together firms in an industry and bolster structural cohesion. While I recognize that many forms of institutions including public research organizations (Owen-Smith and Powell 2004) and law firms (Suchman 2000; Suchman and Cahill 1996) shape collaborative patterns in an industry, trade associations are especially important in many industries because of their capacity to organize a large number of member organizations simultaneously (Campbell, Hollingsworth, and Lindberg 1991). In what follows, I detail how and why I anticipate that trade associations influence the likelihood that firms forge collaborative relations

with each other. My argument focuses on the interactions between two forms of pressures -- integration and differentiation – which I expect are important for understanding how firms are affected by shared membership in institutions. I will use this discussion about trade association as a case for understanding the larger theoretical issue of how institutions shape network evolution.

Institutional Pressures towards Integration

Three inter-related mechanisms explain why institutions in general, and trade associations in particular, are expected to have a positive effect on structural cohesion. First, individuals or firms who participate in the same institutional context are more likely to encounter each other and therefore also more likely to form deeper social or economic relationships. Institutions are important for the formation of new relationships because they provide individuals and organizations with opportunities to meet other members of their field who they otherwise might have been unaware of. This idea is at the core of Feld's (1981) now classical work about social foci and interpersonal relationships, and many recent studies about shared contexts and network formation (Kossinets and Watts 2006; Kossinets and Watts 2009; Sorenson and Stuart 2008).

The insight that institutions shapes networks by enabling new encounters is has also been proposed in studies about trade associations. Trade associations often set up various networking arenas including meetings, conferences, and more recently interactive websites. In these venues, firms develop awareness of each other. For example, technical committees are often organized by trade associations, and Rosenkopf and colleagues (2001) have demonstrated that firms by participating in technical committees learn about

potential partners for future strategic alliances. The effect of shared membership in committees on subsequent collaboration is found to be particularly strong when the two firms have not worked together in strategic alliances in the past and when the firms lack resources to attract collaborators. The authors conclude that firms' participation in shared industry activities is not only a means to influence technological standards but also "part of a larger strategy for knowledge acquisition and partner identification" (p 767). The idea that trade associations enables new encounters and interactions is also supported by Saxenian's (1994) research about the semiconductor industry. Similarly to Rosenkopf and colleagues, Saxenian finds evidence that membership in trade associations fosters social networks among firms. Social networks explain in turn why some communities like the Silicon Valley region have high and sustainable levels of innovation and economic growth.

Second, shared membership in institutions is likely to increase the likelihood of relationships by standardizing technologies and practices. Technical coordination and standardization is an explicit goal of many associations and committees including trade associations (Farrell and Saloner 1988). Standardized technologies and practices ease interactions in several different ways. When individuals and firms use the same technologies and practices they find it easier to both communicate and develop shared routines for their joint endeavors. Standardized technologies and practices also provide members of a market with stronger incentives to collaborate with each other. This mechanism fosters cohesion by increasing the average number of ongoing relationships that an individual or firm engage in. For example, Stuart (1998) finds that firms are more

likely to form strategic alliances if they use technologies that are similar to many other firms.

A third reason for why institutions are likely to integrate firms in an industry has to do with their impact on identities and broader cultural understandings. One of the most important findings in prior research on network formation is that individuals and firms tend to interact with partners similar to themselves (Blau 1994; McPherson, Smith-Lovin, and Cook 2001). In institutions, firms develop perceptions that they are part of the same enterprise (DiMaggio and Powell 1983). For example, trade associations and other professional grouping often play an important role in defining which practices that are legitimate and desired in an industry (Greenwood, Suddaby, and Hinings 2002). Moreover firms' engagement in collective action in trade associations highlights firms' shared goals and identities (Schneiberg 1999). Because trade associations makes it more likely that firms see themselves as similar and because firms are likely to chose collaborators similar to themselves, trade associations are likely to increase the level of structural cohesion in an industry.

Taken together, these three reasons provide ample support for the idea that shared memberships in institutions such as trade associations increase the likelihood that two firms form a collaborative relation. Trade associations exert institutional pressures that integrate firms in an industry into a network of social and economic activity. Thus, I hypothesize:

Hypothesis 1 (H1): Firms that are share more memberships in trade associations are more likely to collaborate with each other.

Institutional Pressures towards Differentiation

In addition to integration, I anticipate that institutions also exert pressures that emphasize distinctions. Feld (1981) argued long ago that the effect of shared activities on network patterns is contingent on the nature of the setting. McPherson and Ranger-Moore have shown that individuals' participation in membership based organizations depend on their characteristics (1991). In the same vein, I expect that trade associations in order to build membership need to find internal mechanisms that differentiates between firms. Thus although institutions like trade associations in general can be expected to have a positive influence on collaboration in a field, I also predict that the effect is not uniform across pairs of firms because firms are likely to vary in way that they take part in the activities that occur in trade associations.

Several braches of sociological thought supports the assertion that institutions distinguishes internally between subgroups that have different characteristics and interests. In the sociological literature on professions and organizations, institutional subdivisions and communities have been widely studied. Galaskiewicz (1985) has demonstrated that corporations with giving officers that are close to each other in social space are more likely to donate resources to the same non-profits. Dezalay and Garth's (1996) work on categories used to resolve business disputes finds that people in different groups had their own way to define and represent legal categories. Greenwood and colleagues (2002) shows that professional groupings mattered for the emergence of multidisciplinary business services that combined managerial, financial, and legal advice

into one firm. In all of these studies, fields are organized around cliques of people with similar characteristics, interests, and world views.

Abbott's (2001) theory about self-similar social structures formalizes the idea about populations and their sub-communities in an elegant way. He argues that the criteria that distinguish among people in a population also are important for understanding distinctions in more homogenous subsets of that population. Interestingly the fraction of people that falls in different categories in the population tends to mirror the fractions that exist in the subgroup. He gives a couple of examples: "Literature on cities separated 'social organization and 'social disorganization' only to find the latter category redivided by writers who saw a 'social order of the slum'. Studies of labor markets divide core and periphery only to find smaller cores and peripheries within each of these. Frazier's celebrated analysis of the black elite argued that the black bourgeoisie stood in much the same relation to the black mass as whites did to blacks in general" (p 158). If Abbott's theory about self-similar social structures is correct, we can expect that sub-groupings that replicate the larger divides in a field form also in smaller and relatively homogenous institutions. Thus pressure towards differentiation is likely to moderate the pressures towards integration that come from shared membership in an institutions. If this prediction is true, shared memberships in an institution increase collaboration; yet it does so along the lines of social structures. Rather than building one fully integrated community, activities in institutions reinforce already existing clusters and cliques in the field.

I will now return to my discussion about trade association to develop this idea into a set of hypothesis. Trade associations can be structured around different forms of firm-

level distinctions. I will focus especially on differences in geographic coverage, market niches, and status between firms. I propose that these dimensions are important for theorizing about distinctions inside trade associations. Geographic differences refer to distance in physical space, differences in the market niches is defined as separation in the targeted industries or clients, and status differences are disparate positions in the industry's internal hierarchy of prestige and symbolic recognition. Since activities in trade associations tend to take differences in geographical, market focus, and status differences into account, I expect that shared memberships in trade associations have a weaker effect on collaboration when firms are different along these dimensions.

First, the role of geography in shaping networks has been highlighted in several recent studies. These works propose that firms that operate in different locales are less likely to encounter each other and even when they do, distant firms have low incentives to work together due to the uncertainty and difficulties in structuring such ties (Sorenson and Stuart 2001). Inter-firm network are therefore densest within regions even if ties to other locales often have a positive effect on firms (Whittington, Owen-Smith, and Powell 2009). In addition to this direct effect of geographic differences on firms' relations, I expect that firms separated by physical space are less affected by shared membership in collective industry bodies such as trade associations. While many trade association similar to professional groups seek to generate "invisible colleges" (cf. Crane 1972) where the role of physical distance is limited, we can still expect that the localized practices of many associations makes it likely that firms' participation in shared activities are affected by geographic differences. Thus I expect that the effect of trade associations

is weaker for firms that are separated by higher geographical distance. Building on this idea of institutional contingencies, I hypothesize:

Hypothesis 2 (H2) Geographical differences decreases the effect of shared memberships in trade associations on collaboration

Second, I expect that firms' activities in trade associations depend on their positions in the market place as defined by their target clients. To the extent that policy-makers and other regulators tolerate cooperation (Dobbin and Dowd 1997; Schneiberg 1999), firms with higher competition between them are more likely to be involved in shared activities than other firms because of their similarities and overlapping interests (Wholey and Huonker 1993). I expect therefore that similar clients constitute another organizational basis that structures activities inside trade associations. Firms targeting the same kind of clients are likely to be involved in similar activities in the trade associations. Following my reasoning above, they are more likely to encounter each other and interact, and also more likely to be affected by the development of standards and shared identities. These mechanisms make the effects of shared membership on collaboration particularly strong for firms that serve similar clients. Reversely, firms operating in different market segments are likely to be differently integrated in trade associations and less affected by shared membership in trade associations. I hypothesize:

Hypothesis 3 (H3) Differences in market niches (target clients) decreases the effect of shared memberships in trade associations on collaboration

Finally, I expect that firms' participation and role in trade associations depend on their status in the industry. Status can be defined as a firm's position in an existing structure of affiliations (Benjamin and Podolny 1999; Podolny 2001). Prior research has demonstrated that firms tend to select partners for collaboration that have similar status as themselves in the industry, especially when they are faced with high degrees of market uncertainty (Podolny 1994). I anticipate the similar processes occur inside trade associations. Firms of similar status are expected to participate in similar activities in the trade association and therefore more likely to form the informal connections that enable subsequent formation of a formal tie. On the other hand, firms that occupy different positions in the status hierarchy are less likely to interact inside a trade association despite shared membership. Following the same logic as the previous hypotheses, I expect that the effect of trade associations on collaboration decrease with status differences between the two firms. I hypothesize:

Hypothesis 4 (H4) Differences in status decreases the effect of shared memberships in trade associations on collaboration

Data and Method

To test my hypotheses about the effects of shared institutions on network evolution, I draw on a dataset about the venture capital industry. I examine specifically how venture capital firms' collaboration on investments was affected by firms' shared membership in trade associations. My analysis focuses on all venture capital firms with at

least one investment in a U.S based company between the years 1981 and 1988. This time period is important for understanding the formation of the network structures that today are seen as crucial for the performance of venture capital firms. Venture capital firms had in the two proceeding decades increasingly collaborated with each other on investments as a result of new regulation and cultural changes in the industry predominately on the West Coast (see Chapters 2 and 3). During the 1980s, the practices of collaboration became institutionalized as the industry moved towards increased specialization. Prior work in the field of business history suggests that trade associations was one factor that contributed to the development of the modern venture capital industry, including its network structures (Reiner 1989).

The dependent variable in this paper is a binary indicator set to one if a firm (partner 1) forms an investment relation with another firm (partner 2) in a given year. Data on all venture capital firms and their co-investments were collected from the VentureXpert database, which is a well-known source of information about the U.S. venture capital industry. From these data, I identified all directed dyads that occurred between firms in each year. To distinguish between the firm that initiates a relation and the firm that accepts an invitation for a co-investment, I follow a method developed by Sorenson and Stuart (2008) for analyzing the direction of co-investment relations in the venture capital industry. Venture capital deals are typically structured by a lead investor. The lead investor structures deal and makes decisions about which other firms to invite into the investment syndicate, if any. Firms in the two roles – lead investors and investment partners in the syndicate -- often have different characteristics and motives for entering into a collaborative deal (Lerner 1994). I treat the lead investor as the firm

that initiates the relation (partner 1) and other firms participating in the investment as invited (partner 2) to account for the fact that the mechanisms that drive the formation of relations often are asymmetric. Empirically a lead investor is identified as a firm that was the sole financier in the first venture capital round. If more than one firm was involved in the first round, the lead investor is defined as the company that invested in the first round as well as all subsequent rounds. I exclude cases where no lead investor could be identified from my analyses.

In the venture capital industry, similar to many other industries, the number of relations that actually exists is a very small fraction of all possible relations that could exist. In the period of interest, the number of relations that were forged between venture capital firms represents merely 0.041 % of the possible directed dyads among all active firms. I use therefore a rare event logit design to estimate the effects of my independent variables and control variables on the likelihood that two firms enter into an investment relation in a given year. For each year, I identify a risk set of relations that could have formed but did not. Following prior research (see e.g. Jensen 2003), I then sample ten non-realized relations for each relation that that did occur. Since the industry grew significantly during this time, I stratify my sampling scheme by year to maintain the temporal balance between relations that formed and did not form. I used the combined sample of realized and non-realized relations to estimate models.

My first hypothesis (H1) predicts a positive effect of shared membership in trade association on the likelihood that the two firms collaboration on an investment. For each year and pair of firms, I generate a variable that measures the number of trade associations that both firms are members of. The variable, similar to all other independent

variables and controls, is lagged by one year to ensure temporal priority. Data on membership in trade associations were collected from printed volumes of Pratt's Guide to Venture Capital Sources, which is another well-known and respected source of data about venture capital firms. While Pratt's Guide has been published since 1970, information about membership in trade association was unfortunately not included until 1981. From Pratt's Guide (various issues), I collected annual data on each firms' memberships in four major associations. The associations are the American Association of Minority Enterprise Small Business Investment Companies (AAMESBIC), the National Association of Small Business Investment Companies (NASBIC), the National Venture Capital Association (NVCA), and the Western Association of Venture Capitalists (WAVC). Table 4.1 shows characteristics of the membership of the four trade associations in 1981 and 1987. The last column of Table 4.1 shows the averages for all firms in an industry, which I will use as a reference point for my discussion.

Table 4.1 Characteristics of Major Trade Associations in 1981 and 1987

Variable	AAMESBIC	NASBIC	NVCA	WAVC	Industry
Membership in 1981 *	5.22%	52.17%	36.96%	4.78%	n/a
Membership in 1987 *	2.24%	36.53%	39.80%	19.18%	n/a
Members' investments by region in 1981					
Northeast	12.99%	24.40%	23.54%	7.69%	24.86%
West Coast	10.39%	25.82%	43.93%	80.44%	36.48%
Other Regions	76.62%	49.78%	32.53%	11.87%	38.66%
Members' investments by region in 1987					
Northeast	34.38%	23.47%	25.32%	14.71%	24.53%
West Coast	22.92%	35.26%	44.50%	66.53%	44.26%
Other regions	42.71%	41.26%	30.17%	18.76%	31.20%
Members' investments by industrial sector 1981					
IT (incl hardware)	24.68%	42.03%	54.89%	65.94%	50.69%
Medicine	11.69%	8.81%	11.84%	13.32%	10.34%
Other industries	63.64%	49.16%	33.27%	20.74%	38.97%
Members' investments by industrial sector in 1987					
IT (incl hardware)	36.22%	57.74%	63.31%	67.97%	61.86%
Medicine	2.55%	13.81%	15.14%	14.11%	15.06%
Other industries	61.22%	28.45%	21.55%	17.92%	23.08%
Average status of members 1981 †	0.010	0.035	0.067	0.086	0.038
Average status of members in 1987 †	0.008	0.028	0.045	0.047	0.027
* Percentage of firms in the industry † Status measured as eigenvector centrality					

AAMESBIC and NASBIC were mainly composed of firms licensed by under the MESBIC and SBIC programs of the Small Business Administration (SBA). SBICs are financial intermediaries that can leverage their private capital with government funds. MESBICs are a subset of the SBIC industry that makes investments in companies with owners from minority groups. NASBIC was the largest association in the field of venture

capital in 1981, but the association declined in membership during the 1980s as the number of SBICs decreased (see Chapter 2). AAMESBIC was a smaller association which can be explained by the fact that the MESBIC program was a relatively small segment of the SBIC program. One of the political goals behind the SBIC and MESBIC program was to make capital available to entrepreneurs in a range of industries and in different geographical regions (see Chapter 2). The diversity goal was reflected in the memberships of AAMESBIC and NASBIC. The status of NASBIC's member is close to the industry average, but the status of AAMESBIC's members was lower than the average, probably because many firms in this association were relatively small in size.

NVCA is the general trade association in the venture capital industry. The association focused especially on private venture capital firms that were not licensed under the federal SBIC program. NVCA grew in membership during the 1980s and it had by 1987 surpassed NASBIC as the largest trade association in the industry. The targeted industries and regions of NVCA's members are similar to the industry at large. The members had however higher status than firms in average. Finally, WAVC organizes the interests of firms that invest in companies on the West Coast. The association has its roots in an informal network of investors in the San Francisco Bay Area. Yet while WAVC started as a small regional association, the trade association is still viewed as one of the most important organizations in the venture capital industry, especially during the early history (Reiner 1989). Members of WAVC tend to be higher status venture capital firms with a large share of investments in the IT industry. I use data about firms' membership in these four associations to test my first hypothesis suggesting that shared membership in association increases the likelihood that two firms form a relationship.

My next set of hypotheses examines how the effect of shared memberships in trade associations depends on differences in the firms' positions in the industry. Hypothesis 2 proposes a negative interaction effect between shared memberships and the geographical difference that exists between firms. I measure the geographical difference between each pair of firms by calculating the overlap in the regions that they invest in. This measure captures differences in firms' presence in different geographic locales and it is advantageous to measures based on the head quarter addresses since such data reduce the activities of a firm to a point in physical space. For each venture capital firm, I collected data on the states in which it made investments from the VentureXpert database. I used a ten year window to measure the firms' investment profile, since venture capital firms' investments are associated with long-term commitments. Moreover, venture capital firms' investment activities follow a cyclical pattern where some years are characterized by new investments and other years are focused on helping the companies that they invest in to grow (Gompers and Lerner 1999). The ten year window reduces missing data from period when the firms do not focus on new investments⁵. I aggregated the state-level data to regional investment profiles defined as the proportion of each firm's investments that falls into each of the six regions that are used in the industry to describe investment patterns: Mid-Atlantic, Midwest, Northeast, Southeast, Southwest, and the West Coast. I thereafter calculate the difference between two firms' geographical investment profiles as:

⁵ Firms without any investments in the past ten years are considered inactive and excluded from my analysis.

$$\text{Difference}_{ij} = \sum_{k=1}^K (p_{ik} - p_{jk})^2$$

where p_{ik} is proportion of partner 1's investments in a region k and p_{jk} represents partner 2's investments in the same region. The measure ranges from 0 to 2 where higher values represent greater differences between the two firms' investment patterns. I test Hypothesis 2 by interacting the variable for shared memberships in trade associations with the variable for geographical differences. The variable for geographical differences is centered on its mean to facilitate the interpretation of the main effect for memberships in trade associations.

Hypothesis 3 proposed a negative interaction effect between shared membership in trade associations and differences in target clients. Based on data from the VentureXpert database, I classified all companies that received funds from venture capital firms into eighteen different industries. The classification was based on the VEIC system which is a commonly used classification schema for venture capital investments. For each firm and year, I used a lagged ten year window to create a profile of the proportion of the firms' investments that fall into each industrial category. Similar to my measure of geographical differences, I calculate differences in targeted clients as the squared differences in the proportion of the firms' investments in each category and sum that over all categories.

My fourth and last hypothesis proposed a negative interaction between shared membership in trade association and status differences between the two firms. Following prior research in economic sociology and organization theory (Benjamin and Podolny 1999; Podolny 2001), I identify status as a structural property that reflects how central the

firm is in the existing network of co-investing venture capital firms. For each year, I construct a cross-section of the co-investment network by using the history of investment made jointly by venture capital firms. A co-investment tie between two firms is assumed to last until the company that they invested in becomes publically traded or acquired by another company. I assume that investments without valid end dates last for ten years which is a common life span for venture capital investments especially during this historical period (Gompers and Lerner 1999). I measure each firm's status as its eigenvector centrality in this network of prior co-investments. Eigenvector centrality is a structural indicator of status which takes into account how many collaborators a firm has in a network as well as the centrality of those collaborators (Bonacich 1987). I calculate the Eigenvector centrality measure with the Igraph package in R. For each pair of firms, I take the absolute value of the status difference and interact it with my measure of membership in trade associations to test Hypothesis 4.

Beyond these variables, my analyses control for a set of other factors that are known to predict collaboration between firms. First, I control for a venture capital firm's tendency to make any investments in a given year. Firms that are less likely to invest are also less likely to form co-investment relations. I include two variables that measure the number of years since the most recent investment by the potential lead investors (Partner 1) and the investment partner (Partner 2) respectively. I take the natural logarithm of this variable to reduce skewness. Aside from that, I also expect that the general tendency to invest depends on the age of the firm's youngest fund. Younger funds tend to have more resources available for making new investments. Limited partners with stakes in the fund also tend to expect that the firm use those resources during the early years of the fund's

life span. For these reasons, I expect that firms with a younger fund are more likely to invest, and consequently for co-investment relations. I calculate the age of all funds managed by the venture capital firm, and use the natural logarithm of the minimum age to control for this idea.

I next control of effect of being a generalist compared to being a specialist in the venture capital industry. In the 1980s, several specialized venture capital firms were formed. These firms targeted their investments toward a specific form of companies for example biotechnology or software (Bygrave and Timmons 1992; Wilson 1985). The level of specialization can be anticipated to affect collaborative patterns in several ways. Generalists may have incentives to form relations with specialists because of specialists' unique knowledge about specific market niches. At the same time, specialists may also have incentives to form ties with other specialists and generalists, since they tend to be smaller firms without the resources that a firm need to make investments alone. To control for both possibilities, I measure the extent to which a firm can be considered a generalist with an inverse Herfindahl index summed over the eighteen industrial classes in the VEIC system. Also this variable is highly skewed and therefore transformed on a natural logarithm scale. Higher value of this measure indicates that the firm is generalist investing in a broad spectrum of industry classes.

Venture capital firms also differ in the investment stage that they focus on. Early stage investments are associated with higher risk taking and such focus requires that the firm builds a different form of networks than if it were to focus on later investment rounds with lower levels of risk (Podolny 2001). Lerner (1994) has shown that lead investors tend to be firms focused on earlier rounds. They collaborate with firms focused

on in later rounds to exploit the valuable information that they collect during the early high-risk rounds. To control for this finding from prior work, I construct a variable that measures the natural logarithm of the average investment round that the firm participated in the past ten years. I expect that firms with lower averages for the investment round are more likely to form a tie as a lead investor (Partner 1) and firms with higher values are more likely to be joining other firms as investment partners (Partner 2)

Firms' likelihood to collaborate on an investment can also be explained by their prior performance. High performing firms are more likely to have resources for making any forms of investments, and they are also more attractive as collaborators. In the venture capital industry, firms generate financial returns when the companies that they invest in are acquired or issue shares in a public stock market. For each firm, I include a variable for the number of liquidity events (initial public stock offerings or acquisitions) that occurred in the firms' investment portfolio the prior year. I use the natural logarithm of this variable in my models since the count of liquidity also is a highly skewed variable.

Finally I control for a set of dyadic characteristics that are known to influence the formation of relations among firms. Firms that are close to each other in the current network are more likely to form relations in subsequent years. Firms that are one step away from each other have experience from working together and are likely to form repeated ties due to trust and shared routines (Kogut, Urso, and Walker 2007), firms that are two steps away from each other are indirectly connected and likely to learn about

each other from their shared third partner (Gulati and Gargiulo 1999), and so on⁶. Using my network data, I calculated the shortest path between each pair of venture capital firms in each year. The measure was calculated with the Igraph Package in R. The shortest network path is undefined if the two firms are located in two disconnected network components. For these firms, I set the shortest path as one higher than the longest observed path between any pair of firms in that year.

A large literature in network research has also shown that firms are more likely to collaborate with firms that are similar to themselves and reversely less likely to work with dissimilar firms. This tendency is referred to as homophily (Blau 1994; McPherson, Smith-Lovin, and Cook 2001). Similarly we know that venture capital firms are more likely to collaborate if the distance between them in social and geographical space is low (Sorenson and Stuart 2001; Sorenson and Stuart 2008). I control for the homophily argument by including the main effects of geographical differences, differences in targeted clients, and status distance into my models. I expect to find a negative effect of the three variables on the likelihood that two firms form a co-investment relation.

Table 4.2 and Table 4.3 present descriptive statistics and bivariate correlations for all variables. From these data, I predict the likelihood that two firms collaborate on an investment with a series of logistic regressions. Statistical significance is assessed with two tailed tests using a 95 % confidence level. All models include yearly dummy

⁶ Prior research on social networks suggests that structural distance, similar to geographic distance, might have an exponential effect on the likelihood of tie formation (Kossinets & Watts, 2009). I find in a set of robustness analyses that a logarithmic transformation of my shortest path variable does not change my results. The effect of the shortest path on tie formation remains statistically significant ($p < 0.001$) and the magnitude and standard errors of my independent variables replicates closely the models without the logarithmic transformation of the shortest path variable.

variables to control for period specific effects that may shape collaborative patterns such as the political, legal, and economic environment. In subsequent robustness analyses, I also estimate my models with the rare logit module developed for Stata by Tomz and colleagues (1999). Their estimation technique can generate more efficient estimates in data where the dependent variable is a rare event. I find qualitatively similar results to the findings presented in this paper.

Table 4.2 Descriptive statistics

Variable	Mean	S.D.	Min	Max
(1) Tie Formed	0.471	0.499	0.000	1.000
(2) P1: Time since last inv.	0.107	0.345	0.000	2.303
(3) P2: Time since last inv.	0.111	0.356	0.000	2.303
(4) P1: Age of youngest fund	1.122	0.820	0.000	3.638
(5) P2: Age of youngest fund	1.193	0.840	0.000	3.664
(6) P1: Industry generalist	1.459	0.510	0.000	2.408
(7) P2: Industry generalist	1.445	0.511	0.000	2.408
(8) P1: Mean investment round	1.154	0.224	0.693	1.946
(9) P2: Mean investment round	1.165	0.234	0.693	2.079
(10) P1: Liquidity events	0.729	0.758	0.000	3.178
(11) P2: Liquidity events	0.707	0.733	0.000	3.178
(12) P1 and P2: Shortest path	2.487	1.627	1.000	9.000
(13) P1 and P2: Geographical diff.	0.000	0.461	-0.441	1.559
(14) P1 and P2: Industry diff.	0.000	0.329	-0.288	1.712
(15) P1 and P2: Status diff.	-0.002	2.499	-1.976	10.007
(16) P1 and P2: Shared trade ass.	0.567	0.684	0.000	3.000
(17) Geographic diff X trade ass.	-0.095	0.308	-1.318	1.559
(18) Industry diff X trade ass.	-0.075	0.204	-0.848	1.712
(19) Status diff X trade ass.	-0.421	1.656	-5.928	19.074

Table 4.3 Bivariate Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) Tie Formed	1.00																	
(2) P1: Time since last inv.	-0.28	1.00																
(3) P2: Time since last inv.	-0.27	0.08	1.00															
(4) P1: Age of youngest fund	-0.28	0.29	0.08	1.00														
(5) P2: Age of youngest fund	-0.20	0.06	0.26	0.07	1.00													
(6) P1: Industry generalist	0.29	-0.44	-0.07	-0.15	-0.06	1.00												
(7) P2: Industry generalist	0.29	-0.09	-0.45	-0.07	-0.10	0.08	1.00											
(8) P1: Mean investment round	0.26	-0.38	-0.09	-0.15	-0.05	0.26	0.11	1.00										
(9) P2: Mean investment round	0.30	-0.08	-0.37	-0.08	-0.13	0.09	0.29	0.23	1.00									
(10) P1: Liquidity events	0.36	-0.26	-0.11	-0.22	-0.08	0.39	0.11	0.39	0.18	1.00								
(11) P2: Liquidity events	0.31	-0.08	-0.25	-0.08	-0.18	0.08	0.40	0.13	0.39	0.27	1.00							
(12) P1 and P2: Shortest path	-0.33	0.26	0.27	0.13	0.11	-0.27	-0.29	-0.31	-0.33	-0.24	-0.23	1.00						
(13) P1 and P2: Geographical diff.	-0.46	0.26	0.25	0.16	0.13	-0.31	-0.30	-0.29	-0.30	-0.29	-0.26	0.37	1.00					
(14) P1 and P2: Industry diff.	-0.43	0.39	0.39	0.17	0.15	-0.61	-0.60	-0.32	-0.33	-0.33	-0.30	0.42	0.47	1.00				
(15) P1 and P2: Status diff.	-0.30	0.22	0.24	0.11	0.08	-0.25	-0.27	-0.28	-0.30	-0.20	-0.20	0.82	0.35	0.41	1.00			
(16) P1 and P2: Shared trade ass.	0.34	-0.16	-0.15	-0.12	-0.09	0.24	0.26	0.19	0.19	0.26	0.25	-0.21	-0.30	-0.33	-0.25	1.00		
(17) Geographic diff X trade ass.	-0.38	0.16	0.15	0.13	0.11	-0.21	-0.20	-0.23	-0.23	-0.28	-0.25	0.21	0.55	0.32	0.24	-0.50	1.00	
(18) Industry diff X trade ass.	-0.39	0.21	0.20	0.14	0.11	-0.34	-0.35	-0.24	-0.25	-0.30	-0.28	0.24	0.35	0.53	0.30	-0.57	0.64	1.00
(19) Status diff X trade ass.	-0.30	0.13	0.13	0.11	0.06	-0.17	-0.19	-0.22	-0.23	-0.23	-0.22	0.40	0.25	0.28	0.54	-0.41	0.48	0.56

Results

Collaboration is ubiquitous among venture capital firms. In the period of interest, 848 new relations were formed in average in each year between lead investors and investment partners. In the middle of the 1980s, close to 95 % of all venture capital firms were interconnected by these co-investment relations into a large network component (see Chapter 3). My models estimates how firms in this context where influenced by their membership in trade associations when selecting investment partners. Table 4.4 summarizes the findings from my empirical analyses. Consider first Model 1, which offers a baseline for my discussion by estimating the effects of my control variables without my independent variables. The results in this model support largely findings from prior research on inter-firm networks and the venture capital industry. I find that firms with longer durations since their last investment are less likely to form relations both as lead investors and investment partners. This effect is expected since those firms are less likely to make any investments, and therefore also less likely to form new investment relations. Similarly, I find that firms with older funds are less likely to collaborate. Also this result can be explained by the fact that such firms in general tend to make fewer investments. I find, however, no statistically significant effect on collaboration of being a generalist. The absence of this effect in the data from this earlier period is likely to reflect that specialization was a relatively new trend in the industry in the 1980s. In a separate study, I find that specialists in a later historical period of the venture capital industry (in the years from 1987 to 2005) were more likely to be both lead investors (partner 1) and investment partners (partner 2) (Buhr and Kacperczyk 2010).

Table 4.4 Estimated Effects on the Probability that a Lead Investor (P1) Forms a Tie with another Firm (P2)

Variable	M1	M2	M3	M4	M5	M6
P1: Time since last inv.	-2.885 *** (0.435)	-2.900 *** (0.438)	-2.897 *** (0.437)	-2.866 *** (0.431)	-2.892 *** (0.432)	-2.873 *** (0.429)
P2: Time since last inv.	-1.506 *** (0.249)	-1.547 *** (0.251)	-1.547 *** (0.251)	-1.541 *** (0.248)	-1.539 *** (0.247)	-1.538 *** (0.246)
P1: Age of youngest fund	-0.459 *** (0.041)	-0.460 *** (0.041)	-0.461 *** (0.041)	-0.464 *** (0.042)	-0.463 *** (0.042)	-0.465 *** (0.042)
P2: Age of youngest fund	-0.235 *** (0.038)	-0.235 *** (0.038)	-0.236 *** (0.038)	-0.236 *** (0.038)	-0.240 *** (0.038)	-0.240 *** (0.038)
P1: Industry generalist	0.026 (0.104)	-0.028 (0.102)	-0.021 (0.102)	-0.025 (0.102)	-0.015 (0.102)	-0.016 (0.102)
P2: Industry generalist	0.122 (0.102)	0.047 (0.102)	0.054 (0.102)	0.041 (0.102)	0.043 (0.101)	0.041 (0.101)
P1: Mean investment round	-0.239 (0.199)	-0.335 + (0.198)	-0.330 + (0.198)	-0.326 + (0.196)	-0.344 + (0.197)	-0.336 + (0.196)
P2: Mean investment round	0.770 *** (0.194)	0.703 *** (0.193)	0.709 *** (0.192)	0.697 *** (0.192)	0.687 *** (0.192)	0.688 *** (0.191)
P1: Liquidity events	0.581 *** (0.055)	0.538 *** (0.055)	0.534 *** (0.056)	0.526 *** (0.055)	0.526 *** (0.056)	0.520 *** (0.056)
P2: Liquidity events	0.415 *** (0.054)	0.371 *** (0.055)	0.369 *** (0.055)	0.363 *** (0.055)	0.361 *** (0.055)	0.357 *** (0.055)
P1 and P2: Shortest path	-0.311 *** (0.048)	-0.328 *** (0.048)	-0.334 *** (0.048)	-0.343 *** (0.048)	-0.343 *** (0.048)	-0.349 *** (0.048)
P1 and P2: Geographical diff. †	-2.033 *** (0.110)	-1.960 *** (0.110)	-1.827 *** (0.129)	-1.942 *** (0.110)	-1.962 *** (0.109)	-1.921 *** (0.130)
P1 and P2: Industry diff. †	-1.668 *** (0.266)	-1.590 *** (0.261)	-1.568 *** (0.261)	-1.259 *** (0.266)	-1.582 *** (0.257)	-1.379 *** (0.267)
P1 and P2: Status diff. †	0.100 *** (0.028)	0.114 *** (0.028)	0.117 *** (0.028)	0.126 *** (0.028)	0.179 *** (0.032)	0.173 *** (0.032)
P1 and P2: Shared trade ass.		0.361 *** (0.052)	0.310 *** (0.060)	0.207 ** (0.076)	0.270 *** (0.059)	0.181 * (0.078)
Geographic diff X trade ass.			-0.309 + (0.176)			-0.070 (0.190)
Industry diff X trade ass.				-1.135 ** (0.368)		-0.705 + (0.389)
Status diff X trade ass.					-0.134 *** (0.033)	-0.108 ** (0.035)
Constant	-0.230 (0.498)	0.105 (0.496)	0.105 (0.495)	0.197 (0.494)	0.204 (0.494)	0.241 (0.493)
N	6798	6798	6798	6798	6798	6798
LL	-2952.43	-2928.52	-2927.09	-2922.46	-2918.92	-2916.72

+ p<.1, * p<.05, ** p<.01, *** p<.001. Two-tailed tests. Robust standard errors within parentheses. † = mean centered. All models control for year fixed effects.

Model 1 also shows partial support for the idea in the prior literature that collaborative patterns reflect the investment stage that the firm focuses on (Lerner 1994; Podolny 2001). While the tendency of firms focused on earlier stages to be lead investors is not statistically significant in the baseline model, I do find that firms are more likely to participate in investments as partners if they are more focused on later rounds. To little surprise, I find further that firms with higher performance in the prior year are more likely to form relations. Firms with more liquidity events (initial public offerings and acquisition) have a higher probability of being both lead investors and investment partners.

Finally, I find statistically significant results for my four variables of dyadic characteristics. Firms that are further away from each other in the current network are less likely to form a relation. We know from prior work that firms tend to learn about possible collaborators from their current partners (Gulati and Gargiulo 1999), which in offers one explanation for why the shortest path length is associated with the likelihood of collaboration. As expected, I also find that firms with higher levels of geographical differences and industrial differences (target clients) are less likely to collaborate. This finding is supports prior work on homophily (Blau 1994; McPherson, Smith-Lovin, and Cook 2001) and research on distant ties in networks which has shown a negative effect of social and geographical differences on tie formation among venture capital firms (Sorenson and Stuart 2001; Sorenson and Stuart 2008). In contrast, the main effect of status differences is showing an unexpected positive effect on tie formation. While research on other industries shows that firms tend to chose collaborators from their own

status strata (Podolny 1994), venture capital firms are more likely to work together if they occupy different positions in the status hierarchy. One possible explanation is that high status actors seek to exploit power and information advantages (Piskorski and Snellman 2004) by working with firms of lower status.

In the subsequent models in Table 4.4, I test my four hypotheses about the institutional effects from trade associations on firms' collaborative patterns. In Model 2, I start to test my hypotheses by entering the main effect of shared membership in trade associations into my analysis. I expect that firms that have more trade associations in common are more likely to form formal co-investment relations with each other, since trade associations facilitate informal encounters and interactions, standardize the technologies and practices used by firms, and shape firms' identities and cultural understandings. Model 2 offers support for this hypothesis. Before controlling for the idea that the effect of membership depends on firms' positions in the industry, I find a strong positive main effect of shared trade associations. The coefficient from the logistic regression (Model 2) translates into an odds ratio of 1.423 which means that firms that have three trade associations in common are $1.423^3 = 2.89$ times more likely to form a co-investment relation than two firms without any trade associations in common. The finding supports the idea that trade associations are institutions that integrate firms in an industry and foster structural cohesion.

Next I test the idea that the positive effect of shared membership in trade associations depend on firms' positions in the industry. I theorized that firms' roles and activities in trade associations reflect their individual characteristics and not only their collective goals. I start by interacting the variable for shared membership in trade

associations with my variable for geographical differences. If my theory about institutional contingencies is correct, then I expect to find a negative interaction between these two variables. I find marginal statistical support ($P < 0.1$) for this argument using a two-tailed test. While the evidence is not conclusive, I take this result to suggest that geographical differences may moderate the effect of shared membership in trade association on the formation of co-investment relations.

Stronger empirical evidence is found for Hypothesis 3 and 4. I find in Models 4 and 5 that differences in targeted clients and differences in the firms' status have negative interaction effects with shared memberships in trade associations. The positive effect on the likelihood of collaboration coming from shared membership in trade associations decreases rapidly if the two firms occupy different horizontal and vertical positions in the industry. These results remain relatively stable in the full specified model (Model 6) despite some concerns about multicollinearity coming from multiple interaction effects with the variable for shared memberships in trade associations.

The contingencies caused by differences in target clients and status are not only interesting from a theoretical perspective, but their magnitudes are also striking. Consider Figure 4.1 which graphs the probabilities that two firms form a co-investment relation by the number of shared trade associations and different levels of differences in targeted clients. The probabilities are estimated from the fully specified Model 6 and assume that all control variables are at their mean level. The first set of bars shows that firms with similar positions in the industry (defined as differences one standard deviation below the mean) are significantly more likely to form a co-investment relation if they have more trade associations in common. The second and third set of bars shows that the

effect of shared membership in trade associations decreases rapidly if the two firms are more different from each other. When the differences between the two firms are high (defined as one standard deviation above the mean), the effect shared membership in trade associations has disappeared fully.

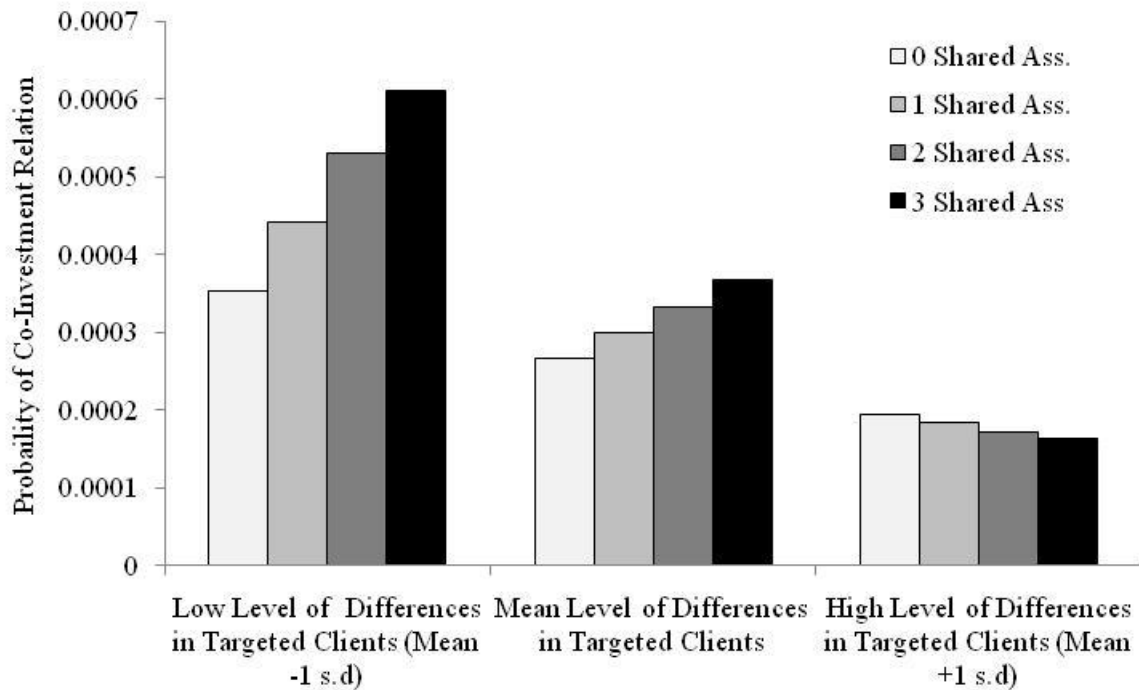


Figure 4.1 Probability that a Co-investment Relation Forms by Number of Shared Trade Associations and Different Levels of Differences in the Industry of the Firm's Clients

A similar pattern is shown in Figure 4.2 which presents the probability of collaboration by shared trade associations and different levels of status differences. The effect of trade associations is strongest when the two firms are of similar status, and decreases then rapidly for firms when larger status differences. Once again, I find that the positive effect of shared trade associations on the likelihood of collaboration diminishes rapidly when firms are more different from each other. Also for status differences, I find

that firms that have differences at a level of one standard deviation above the mean, no longer are likely to form co-investment relations as a result of their shared membership in trade associations.

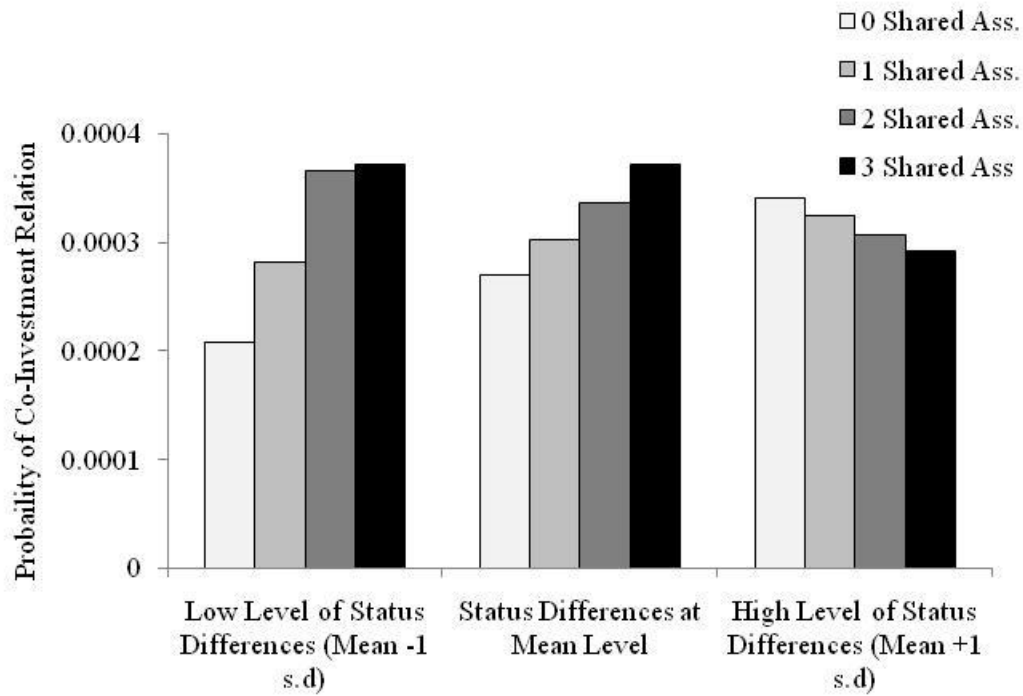


Figure 4.2 Probability that a Co-investment Relation Forms by Number of Shared Trade Associations and Different Levels of Status Differences

Discussion and Implications

The overall message from these analyses is that the pattern of relations that venture capital firms build based on their experience in trade associations depends on the firms' position in the industry. We can formulate this finding in a more general language: Institutional pressures towards integration often go hand in hand with pressures towards differentiation. Institutions in the venture capital firms made firms more likely to form

co-investment relations. The effect of institutions depended however on differences in targeted industries and status. Thus institutions contributed to the development of cohesive homogenous cliques of interconnected firms. Figure 4.3 demonstrates this development over time by graphing the average of the pair-wise difference for firm that form co-investment relations in the period from 1975 to 1990. I find that differences between connected firms decreased significantly during this period. The trend can be observed for all three dimensions that I discuss in this paper: geographic coverage, targeted industries, and states. In other words, networks were increasingly tying together firms that were similar to each other in clusters. I believe that institutional pressures that integrate similar firms while leaving dissimilar firms unaffected by their participation in institutional arenas, offer one explanation for this trend in how the network of co-investments evolved.

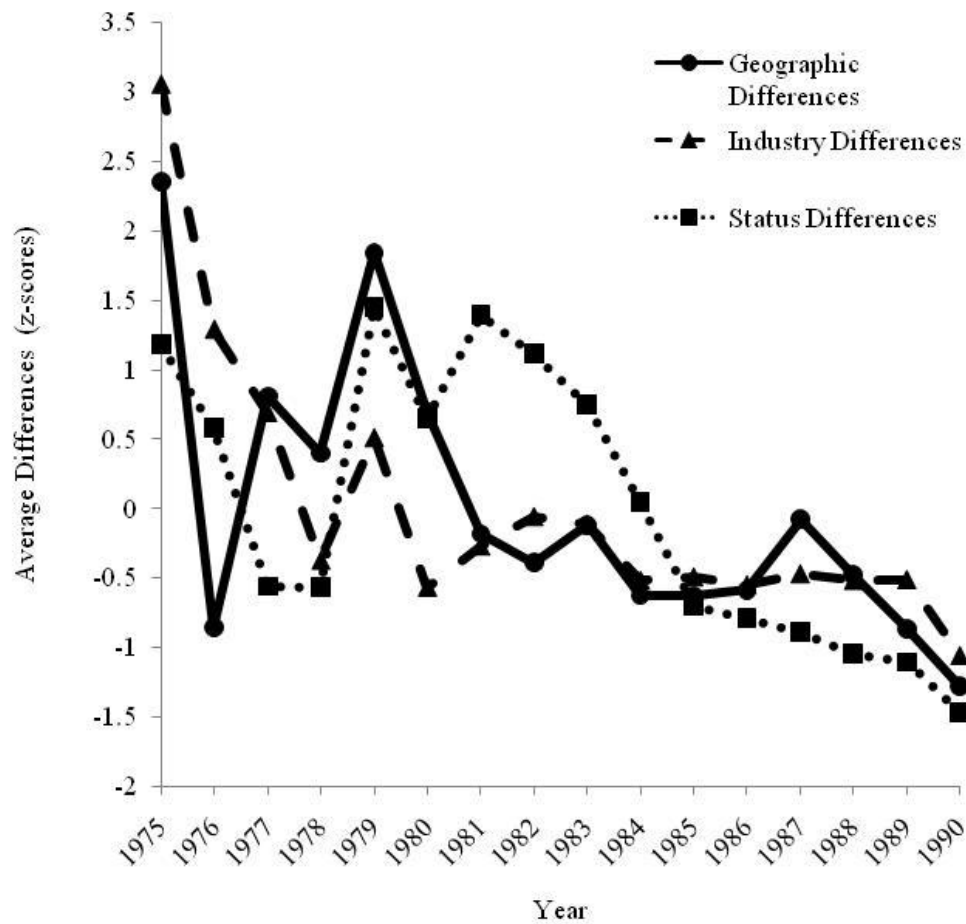


Figure 4.3 Average Pairwise Differences for Firms that Formed Co-investment Ties, 1975-1990

One interesting finding from my analysis is that trade association in the venture capital industry exerted differentiating pressures despite the fact that these trade associations were relatively homogenous institutions. My data shows that venture capital firms that shared more trade associations tend to be more similar to each other than firms that do not share membership in associations. Consider the graph in Figure 4.3 which shows the average diversity for pairs of firms with different numbers of shared trade

associations. Two sample t-tests comparing the level of differences for each trade association my analysis (except AAMESIC which has a small sample size), demonstrate that the pattern holds for each individual association included in my analysis. The limited diversity inside trade association is consistent with several studies in sociology that shows that people often select into social contexts with similar others (Kossinets and Watts 2009; McPherson and Ranger-Moore 1991). Despite homogeneity in my empirical context, distinctions occur inside institutions. This finding has important implications since we can anticipate that institutional pressures towards differentiation are even more salient in context of higher diversity.

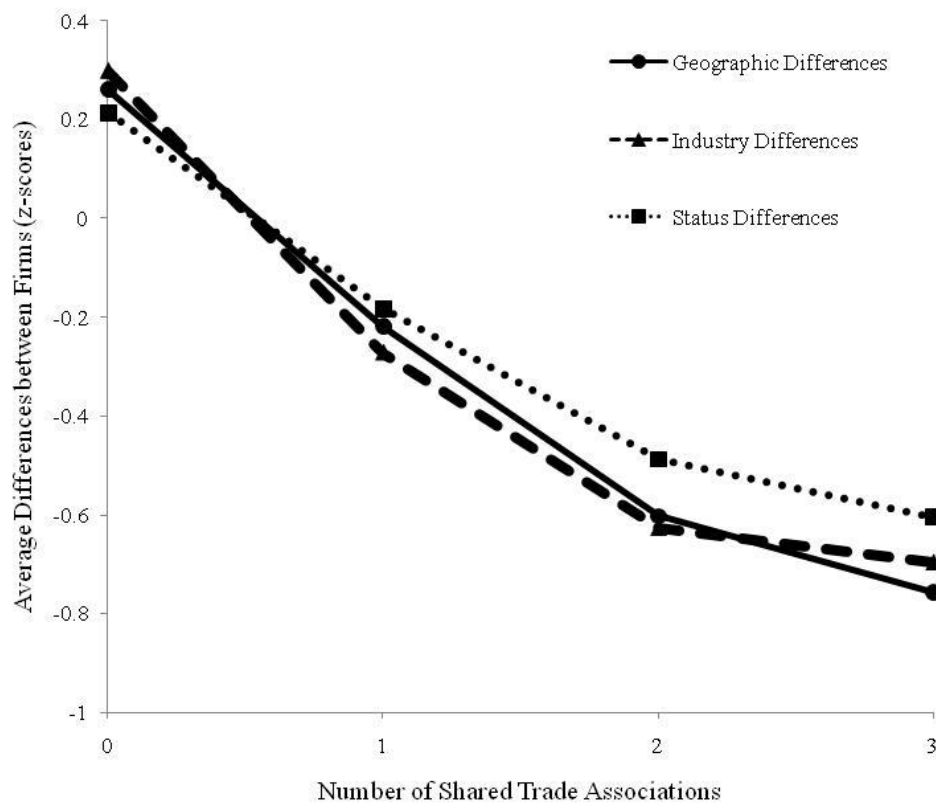


Figure 4.4 Average Pairwise Differences for Firms by the Number of Shared Trade Associations

Several theoretical contributions extend from my results to the literatures on network evolution in sociology and organization theory. First, I make an empirical contribution to the study of inter-firm networks by highlighting the effects of trade associations on inter-firm networks. My work extends the literature on the effects of contextual factors on network formation (Feld 1981; Kossinets and Watts 2006; Rivera 2010; Rosenkopf, Metiu, and George 2001; Rosenkopf and Schleicher 2008; Sorenson and Stuart 2008) by demonstrating that trade associations form one important social setting that integrates firms in an industry and increases the likelihood that they forge collaborative relations with each other. This finding is not surprising given that trade associations often list networking and community building as two explicit goals of their activities. Still the effect of shared membership in trade associations is seldom included in research of firms' networks despite the strength of this effect which makes it likely that prior studies underestimate the degree to which contexts induces network ties among firms.

Second and more importantly for broader theory, I find support for my idea that the pressures towards integration stemming from institutions go along with pressures that separate between members that are situated in different positions in the field. I argued at the front end of this paper that the two co-existing pressures of integration and differentiation result from the fact that institutions seek to meet members' collective goals while also speaking to their individual interests. This means that effects of institutions on collaborative patterns are multifaceted and contingent. Understanding how institutions shape network structures require attention to counteracting pressures as they often moderate the institutional main effects. What external observers of institutions

often see as mechanisms of inclusion, cohesion and community building, can simultaneously be perceived by insiders as mechanisms for stratification and differentiations.

Together these findings offer insights for literatures on network evolution by pointing to fruitful directions for future research. My focus on a single industry during a relatively short time span suggests that it would be valuable to test these ideas in other empirical contexts. Venture capital is an industry where networks are very cohesive and explicitly valued by firms. I expect that firms under such conditions are especially attuned to informal networking opportunities in shared social settings such as trade associations. Individuals and firms in contexts where networks are less important may in contrast be less affected by shared membership. This idea could be tested in comparative analysis since we know that industries (Rosenkopf and Schilling 2007) as well as regions (Fleming, King, and Juda 2007; Powell, Packalen, and Whittington Forthcoming) differ in respect to the relations that exist among firms.

Another fruitful direction for future research is to extend the idea of institutional pressures and contingencies to include multiple shared contexts. Feld (1982) theorized long ago that people are simultaneously embedded in multiple social foci including their family, various organizations, and associations. He predicted that social foci vary in their degree of compatibility and thus they amplify or diminish each other's effect on relational structures. If Feld's theory holds, I expect the effects of institutional contingencies on social and economic networks are even more ubiquitous than I have demonstrated in this paper. Contingencies are then not just a result of competing processes inside institutions. In addition, the effects of institutions depend on how

compatible those arrangements are with other contexts for shared activities including for example educational sites, political arenas, and the family.

Conclusion

An important regularity of many social and economic networks is their tendency to be organized around local cliques with sparse overlaps between them. In this paper, I examine how institutional pressures can explain the development of such network patterns. I focus especially on trade associations as a central institutional base for integration and differentiation in an industry. One the one hand, activities in trade associations largely depend on their members' feeling that they belong to a community. On the other hand, they are organized around distinctions among the firms in the industry and reinforce existing structural differences in the industry. I take the potential tensions between integrating and differentiating institutional pressures as a point of departure for explaining the conditions under which the effects of trade associations on collaboration are amplified or diminished. As expected, I find that firms with shared membership in trade associations are more likely to collaborate with each other. More surprising are the results showing that the effect of memberships in the same trade associations on the formation of co-investment relations decreases as the two firms are located in different positions of the industry. The effect is especially pronounced for firms that invest in different segments of the market and firms that are of different status. There is also some marginal support for the idea that geographical differences weaken the effect of shared membership in trade associations. These findings offer support for my general claim that the effects of collective institutions on the structures of an industry are multidimensional

and contingent. The networks that we observe in industries are results of many social processes than operate simultaneously to induce some collaborative opportunities and constrain firms from entering other relations.

CHAPTER 5: CONCLUSIONS

Economic sociologists have for many years been interested in collaborative relations among firms, and their ramifications for various organizational outcomes. This theoretical perspective explains why trust and reciprocity develop between some competing firms, whereas conflict and opportunism characterize the interactions between other organizations. In this dissertation, my goal has been to explain how the institutions that govern firms' relations form in a young industry, and how institutional factors influence firms' likelihood to collaborate and their choice of partners. Chapter 2 explored how firms can use arguments grounded in professional expertise in political arenas to influence the institutions that structure inter-firm relations. Chapter 3 explained how firms' collaborative decisions can be influenced by managers' prior career experiences in established industries. Chapter 4 demonstrated the effects of trade associations on formation of relations between firms, and contingencies in such effects. In my work, professional expertise, public policy, established industries, and trade associations represent different forms of institutional arrangements that firms in a young industry are influenced by when they make decisions about how and when to form collaborative relations with partners, if at all.

In this concluding chapter, I will discuss the broader theoretical significance of my empirical results. Especially, I will point to a series of important extensions that follow from my theoretical account for research about the emergence of collaborative

inter-firm relations in a young industry. My discussion will be organized around three themes that are central to my empirical papers. First, I will discuss the idea that firms often are exposed to *multiple* institutional pressures. Second, I will attend to *possible interactions* between those institutional pressures. Third, I will offer some thoughts about the *long-term consequences* of the processes that I examine in this dissertation. Speaking to a large literature in economic sociology, I will discuss how my institutional focus contributes to knowledge about the evolution of inter-firm networks.

The Effects of Multiple Institutional Pressures

My dissertation shows that firms in young industries often are exposed to multiple institutional pressures that shape how firms interact and form relationships with each other. These institutional pressures can come from many different sources. Chapter 2 emphasized two sources of institutional pressures: public policy and professionals. Firms in the early history of the private venture capital industry and the SBIC industry were governed by regulation created for large financial institutions especially investment banks and commercial banks. I demonstrated how policy-making processes tried to address perceived misfits between the regulation that was inherited from older financial sectors and the new activities that SBICs and private venture capital firms developed. Private venture capital firms were able to position themselves as a group with professional expertise and were thereby able to influence the policies that governed their financing ties to small businesses. SBICs were in contrast regulated by more detailed state sanctioned regulations.

Chapter 3 also pointed to the importance of institutions inherited from established industries and the mindset of people in an industry. In this paper, managers carried ideas about how to make strategic decisions when moving from established industries into the young venture capital industry. I showed that the background of managers influenced whether or not firms decided to collaborate with other venture capital firms or invest alone in small businesses. This stresses the importance of examining established institutional arrangements including those outside the focal industry to understand how firms perceive and form collaborative ties with each other.

Finally, Chapter 4 added trade associations to the list of institutional influences in young industries. Trade associations are interesting institutions in young industries since they are formed by firms in the industry. Trade associations differ in this respect from many other institutions for example public policy that firms need to negotiate with other interest groups. The analysis in Chapter 4 addressed how firms' participation in trade associations contributed to the development of networks of cohesive homogenous subgroups with relatively few overlaps. I focused on trade associations' institutional capacity to integrate and differentiate between firms in a field.

Public policy, professionals, established industries, and trade association offer four example of important institutions that shape how young industries develop. More institutions could be added to the list for instance educational institutions, law firms, the news media, and consultants. I anticipate that multiple institutional forces are central to the development of many new industries. The exact list of institutions that matter in an industry is ultimately an empirical question.

Possible Interactions between Institutional Pressures

In fields with multiple institutions, questions about institutional interactions are important. The empirical chapters indicate the possibility that institutional influence from different sources may push firms in different directions which in turn may generate a set of institutional tensions that need to be resolved in the young industry. Research about new industries needs therefore to address when institutional pressures interfere with each other. My dissertation examines these questions most clearly in the chapter about trade associations. The chapter shows how the differentiating pressures arising from firms' individual characteristics and interests functioned as a counterforce to the integrating pressures that most prior research has associated with trade associations. I find that the positive effect of shared membership in trade associations on collaboration strongly declines for more different firms. The effect was fully nullified when firms' difference was one standard deviation above the mean.

Different institutional arrangements can also complement each other. Thus research on young industries also needs to ask when different institutions amplify each other to generate stronger institutional effects on firms' behaviors. Chapter 2 offers some insights that point to the possibility of positive interaction between institutions that is cases where two institutional forces operate in tandem and strengthen each other. I showed in this chapter how groups that claimed professional expertise were able to influence regulatory arrangements. While much organizational analysis following DiMaggio and Powell's (1983) work have treated the normative influences of professionals and the coercive influences of regulation and the state as separate forces

that influence organizations, I show that arguments grounded in professional expertise can align with the concerns of policy-makers. Under such circumstance where institutions complement each other, I expect that institutions will have a particularly strong effect on firms' behaviors.

By attending to multiple institutional pressures and institutional contingencies and interactions, my work proposes that young industries can develop along many possible trajectories. The model of small business financing that dominates contemporary capital markets was one of many possible outcomes. From the three empirical chapters, we learn about other alternatives that did not take hold despite being viable options during the early days of the industry. Chapter 2 showed that the state could have played a more important role in the field of small business financing. The SBIC industry was an organized effort by the government to create an industry that would provide financing to companies in diverse industries and regions. Chapter 2 proposed also that both SBICs and private venture capital firms could have been institutions more similar to other financial firms such as investment banks or commercial banks. SBICs and private venture capital firms struggled for several decades to influence regulatory arrangements that would allow them to develop business models that differed from traditional financial sectors.

Chapter 3 offers more evidence for the idea that small business financing could have developed in many other directions. Venture capital firms are today known for their frequent collaboration on investments in companies. Co-investment relations form a network that facilitates the flow of information and resources. I showed in this paper that firms with more commercial bankers had a lower propensity to collaborate on investments than other firms. Thus, the networks that we today take for granted as central

to the venture capital industry could have been less important if commercial bankers had a stronger influence on the industry. Finally, Chapter 4 shows how trade associations influenced collaborative patterns in the venture capital industry. Without shared institutional contexts such as trade association, the level of cohesion and clustering in the networks of the venture capital industry had probably been much lower.

The Long-term Consequences: Towards Stable Network Structures

I will end my concluding remarks by returning to one of the main points in the introduction chapter. At the outset of this thesis, I suggested that neither the characteristics of networks, nor the effects of collaborative relations on organizational outcomes are universal. I pointed to recent empirical studies which have documented that network structures and the benefits that firms can derive from their social and economic relationships varies between regions (Owen-Smith and Powell 2004), between countries (Hamilton and Biggart 1988; Xiao and Tsui 2007) and over time (Gulati and Higgins 2003; Mizruchi, Stearns, and Marquis 2006; Powell, White, Koput, and Owen-Smith 2005). I believe that institutional processes during the early days of an industry contribute to our understanding of such variations in networks and their effects.

The focus on emergence and change leads me finally to the question about when a young and dynamic industry develops more stable network structures. While my empirical papers do not explicitly examine the processes that stabilize certain industry structures, I still believe that my work generates some theoretical propositions about this topic. Building on my discussion in the prior section, I believe that resolution of institutional tensions is a necessary condition for the development of stable network

structures. From literature in organization theory, we know that firms in fields with institutional tensions tend to engage in practices that are likely to lead to continued social change. Some of them are driven by individuals' and social movements' desire to transform the industry, but change can also occur from conservative individuals' and firms' desires to stay in power (Padgett and Ansell 1994). Moreover I expect that the formation of firmer industry boundaries is necessary condition that needs to be met before the collaborative structures in an industry become stable and self-reproducing. My analysis stresses that young industries have porous boundaries and under such conditions the industry will remain a high level of diversity and change. Self-reproducing collaborative patterns are likely to develop in industries with firmer boundaries that allow firms to develop taken-for-granted beliefs and practices.

My work indicates the value of a future research agenda that pays more attention to history and contextual factors to understand interactions among firms. Returning to Granovetter's classical 1985 for a final time, we learn about the importance of applying a sociological perspective like the one develop in this dissertation to understand market processes. Granovetter argued firms' differential embeddedness in social networks explains the opportunities and constraints that firms experience. In my thesis, I have emphasized that differential embeddedness in networks depends on the broader set of social influences that exist in an industry. In young industries, we have to attend to a large range of institutional arrangements to understand what collaboration means to firms.

APPENDIX A: PRIMARY DATA ABOUT SBICS AND VCS

Title	Committee	Date	Chair	SBIC Data	VC Data
Small Business Investment Program of the Small Business Administration -- 1966	Committee on Small Business, Select. House	July 21, 22, 1966	Representative Joseph L. Evins (D-TN)	X	
Investigation into Small Business Investment Companies.	Permanent Subcom on Investigations, Committee on Government Operations. Senate	Aug. 2-4, 1966	Senator Fred R. Harris (D-OK)	X	
Legislation To Amend the Small Business and Small Business Investment Acts	Committee on Banking and Currency. House	July 24-27, 31, Aug. 1, 1967	Representative J.W. Wright Patman (D-TX)	X	
To Determine Guaranty Authority of the Small Business Administration with Respect to SBIC's	Committee on Banking and Currency. House	Dec. 3, 1969	Representative J.W. Wright Patman (D-TX)	X	
Minority Enterprise Small Business Investment Company Act of 1972	Subcom on Small Business, Committee on Banking and Currency. House	June 21-23, 1972	Representative Robert G. Stephens, Jr (D-GA)	X	
SBIC and SBLC Programs and Selected SBA Activities	Subcom on SBA Oversight and Minority Enterprise, Committee on Small Business. House	July 20-22, 1976	Representative Joseph P. Addabbo (D-NY)	X	

Title	Committee	Date	Chair	SBIC Data	VC Data
Small Business Access to Equity and Venture Capital	Subcom on Capital, Investment, and Business Opportunities, Committee on Small Business. House	May 12, 18, July 16, 1977	Representative John J. LaFalce (D-NY)	X	X
Minority Enterprise Venture Capital Act of 1977 and Small Business Investment Company Development Act of 1977	Committee on Small Business, Select. Senate	Oct. 3, 1977	Senator Samuel A. Nunn (D-GA)	X	
Small Business Investment Company Development Act of 1977	Committee on Small Business, Select. Senate	Jan. 23, 1978	Senator Samuel A. Nunn (D-GA)	X	
Capital Formation, Part 1	Committee on Small Business, Select.	Feb. 8, 10, 1978	Senator Gaylord A. Nelson (D-WI)		X
H.R. 9549, the Capital, Investment and Business Opportunity Act	Subcom on Capital, Investment, and Business Opportunities, Committee on Small	Feb. 22, 1978	Representative John J. LaFalce (D-NY)	X	X
Small Business Investment Company Program	Subcom on Capital, Investment, and Business Opportunities, Committee on Small	8-May-78	Representative John J. LaFalce (D-NY)	X	
Small Business Investment	Subcom on Consumer Protection and Finance, Committee on Interstate and Foreign	Sept. 27, 28, 1978	Representative Robert C. Eckhardt (D-TX)	X	X

Title	Committee	Date	Chair	SBIC Data	VC Data
Capital Formation, Part 5	Committee on Small Business, Select. Senate; Subcom on Financial Institutions, Committee on Banking, Housing, and Urban Affairs. Senate	Mar. 3, 5, 1980	Senator Gaylord A. Nelson (D-WI)	X	X
Federal Securities Laws and Small Business Legislation	Subcom on Securities, Committee on Banking, Housing, and Urban Affairs.	Apr. 29, May 16, June 2, 1980	Senator Paul S. Sarbanes (D-MD)	X	X
Venture Capital Improvements Acts of 1980	Subcom on Consumer Protection and Finance, Committee on Interstate and Foreign	17-Jun-80	Representative James H Scheuer (D-NY)	X	X
Small, High Technology Firms, Inventors and Innovation	Subcom on Investigations and Oversight, Committee on Science and Technology. House	July 21, 22, 1981	Representative Albert A. Gore, Jr (D-TN)		X
H.R. 5302, Small Business Venture Capital Act of 1981	Subcom on Tax, Access to Equity Capital, and Business Opportunities, Committee on Small Business. House	Mar. 24, 1982	Representative Henry J. Nowak (D-NY)	X	
Role of the Venture Capital Industry in the American Economy	Subcom on International Trade, Finance, and Security Economics, Committee. Joint	Sept. 30, 1982	Representative Gillis W. Long (D-LA)	X	X
Venture Capital Financing Via SBIC's and MESBIC's	Subcom on SBA and SBIC Authority, Minority Enterprise, and General Small Business Problems, Committee on Small Business. House	Nov. 23, 1982	Representative Parren J. Mitchell (D-MD)	X	

Title	Committee	Date	Chair	SBIC Data	VC Data
Oversight of Small Business Administration's SBIC Programs	Committee on Small Business. Senate	Dec. 16, 1982	Senator Lowell Weicker, Jr (R-CT)	X	
Incentive for Startups and Venture Capital	Subcom on Tax, Access to Equity Capital, and Business Opportunities, Committee on Small Business. House	22-Jun-83	Representative Henry J. Nowak (D-NY)		X
Industrial Policy, Part 4	Subcom on Economic Stabilization, Committee on Banking, Finance, and Urban Affairs. House	Sept. 13-15, 20, 28, 1983	Representative John J. LaFalce (D-NY)		X
S. 408, A Bill To Authorize and Provide Program Levels for the Small Business Administration for FY86, FY87, and Small Business Administration Program Review. (Part 1)	Committee on Small Business. Senate	Feb. 21, 28, Mar. 7, 1985	Senator Lowell Weicker, Jr (R-CT)	X	
	Subcom on SBA and SBIC Authority, Minority Enterprise, and General Small Business Problems, Committee on Small Business. House	Mar. 22, 23, 30, 1985	Representative Esteban E. Torres (D-CA)	X	
H.R. 3608	Subcom on SBA and SBIC Authority, Minority Enterprise, and General Small Business Problems, Committee on Small Business. House	Nov. 7, 1985	Representative Parren J. Mitchell (D-MD)	X	

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